

attach to Report

File

December 12, 1951

E. O. Gangstad

E. G. Nelson

Annual Report -- 1951 -- Sansevieria

I was very pleased to see your 1951 annual report. It is certainly well prepared, as was the one last year, and is a very valuable reference. I realize we have some of these data already in our files, but to have it collected and thus indexed makes it especially valuable.

I have only one question to bring up on the interpretation. In your abstract of results on fiber quality studies, it seems to me that there is a characteristic that you may have overlooked in regard to the effect of fertilizers on tensile strength of fibers. These data seem to indicate that the greatest difference in tensile strength results from a moderate application a nitrogen fertilizer. In other words, the checks are nearly always the lowest strength and even those with the highest rates of application of nitrogen are for the most part stronger than the check plots. The characteristic that impresses me the most about these results is the fact that even fairly heavy applications of a nitrogen fertilizer have given you an increased tensile strength and that the extremely heavy applications have given only a moderate reduction in tensile strength below that for fairly heavy rates and one which I believe in nearly all cases was not found statistically significant. Both of these facts seem a little surprising in view of the general characteristics of fiber plants to have a lower tensile strength under high nitrogen conditions. This, I would say, was pointed out very clearly for sansevieria in contradiction of the other results, by the results of tensile strength of sansevieria grown on the muck. Actually, I do not feel that the above statement is in direct contradiction to what you said about your results. It is noted that you mentioned only a trend and I would not want to imply that you were incorrect.

I am certainly pleased with this report, as I said above, and I am circulating it around to the rest of the Division for their attention and edification.

EGNelson:hls:RSB

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file

December 12, 1951

H. O. Genshard

E. G. Nelson

Annual Report -- 1951 -- Kansasville

I was very pleased to see your 1951 annual report. It is certainly well prepared, as was the one last year, and is a very valuable reference. I realize we have some of these data already in our files, but to have it collected and thus indexed makes it especially valuable.

I have only one question to bring up on the interpretation. In your abstract of results on fiber quality studies, it seems to me that there is a characteristic that you may have overlooked in regard to the effect of fertilizers on tensile strength of fibers. These data seem to indicate that the greatest differences in tensile strength results from a moderate application of nitrogen fertilizer. In other words, the checks are nearly always the lowest strength and even those with the highest rates of application of nitrogen are for the most part stronger than the check plots. The characteristic that impresses me the most about these results is the fact that even fairly heavy applications of a nitrogen fertilizer have given you an increased tensile strength and that the extremely heavy applications have given only a moderate reduction in tensile strength. I believe that for fairly heavy rates and one which I believe in nearly all cases was not found statistically significant. Both of these facts seem a little surprising in view of the general characteristics of fiber plants to have a lower tensile strength under high nitrogen conditions. This, I would say, was pointed out very clearly for Kansasville in contradiction of the other results, by the results of tensile strength of same variety grown on the neck. Actually, I do not feel that the above statement is in direct contradiction to what you said about your results. It is noted that you mentioned only a trend and I would not want to imply that you were incorrect.

I am certainly pleased with this report, as I said above, and I am offering it around to the rest of the Division for their attention and edification.

HOWELSON:dlr:RSE

Nelson

OFFICE MEMORANDUM

30 NOV 51

BELLE GLADE FLA

HDBarker, Head, DC&OFC&D, Plant Ind Sta, Beltsville Md

EOGangstad, Agron, DC&OFC&D, Everglades Expt Sta Belle Glade Fla

Annual Report, 1951, Sansevieria

Attached 1951 annual report on sansevieria summarizing agronomic studies of species and fiber quality initiated in 1947 to 1950.

Agronomic studies relating to the culture of S guineensis for 1943 to 1950 were summarized in the 1950 annual report.

Agronomic studies relating to the culture of S trifasciata in 1949 to 1951 will be summarized in the 1952 report.

The following publications on propagation, frost resistance and chemical weed control are included:

THE VEGETATIVE PROPAGATION OF SANSEVIERIA by J Frank Joyner, Edward O Gangstad and Charles C Seale, Agron Jour. 43, 128-130

THE EFFECTS OF NPK FERTILIZATION ON THE GROWTH, THE LEVEL OF PHOSPHOROUS AND POTASSIUM IN THE SOIL AND TISSUE AND THE COLD INJURY OF SANSEVIERIA TRIFASCIATA PRAIN by EOGangstad, JFJoyner, JBPate, CCSeale and WForsee, paper given at the 1951 meetings of the Amer. Soc. of Agron, Penn State College.

CHEMICAL WEED CONTROL IN SANSEVIERIA WITH CMU (PARA CHLOROPHENYL DIMETHYL UREA) by EOGangstad, CCSeale, JFJoyner and JBPate prepared for the 1952 meetings of the Southern Weed Control Conference, Atlanta Georgia.

Edward O. Gangstad
Edward O. Gangstad
Agronomist BPISAE

Recd 12/5/51

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Outline of Expt.:

- 47-1 Botanical Characteristics
- 47-2 Percent Yield of Fiber
- 47-3 Acre Yield Characteristics
- 47-4 Frost Resistance
- 47-5 Fiber Strength

Abstract of Results:

The species of *sansevieria* have been classified according to botanical characteristics of the leaf, the rhizome and the fibrous root system. Representative species of these three groups have been studied for their potentiality for fiber production in South Florida.

The cylindrical leaf species (Group I) have been found unsatisfactory for commercial production because of their difficulty of propagation, slow rate of growth and low acre yield of fiber.

The coriaceous leaf species (Group II) have shown some promise for annual harvesting because of their ability to produce a rapid growth of leaves when planted from whole plants or rhizomes.

Species of group II have the highest percent of fiber, but have comparatively short leaves and are readily damaged by low temperatures.

The narrow or petiolar leaf species (Group III) offer the best potentialities for production of fiber because of their ability to grow rapidly from leaf cuttings, longer length of leaf and high yield of fiber per acre.

S. trifasciata appears to have the best potentialities for fiber production because of its frost resistance, or tolerance, and greater length of fiber.

Outline of Report:

- 47-1 Historical Characterization
- 47-2 Present Yield of Fiber
- 47-3 Area Yield Characterization
- 47-4 Present Production
- 47-5 Fiber Strength

Abstract of Results:

The species of a character have been classified according to botanical characteristics of the leaf, the thistle and the flower root system. The species of these three groups have been studied for their potentiality for fiber production in South America.

The cylindrical leaf species (Group I) have been found unsuitable for commercial production because of their difficulty of propagation, slow rate of growth and low yield of fiber.

The conical leaf species (Group II) have shown some promise for annual harvest because of their ability to produce a rapid growth of leaves which are suitable for fiber production.

Species of Group II have the highest percent of fiber, but have comparatively short leaves and are readily damaged by low temperatures.

The narrow or peltate leaf species (Group III) offer the best potentiality for production of fiber because of their ability to grow rapidly from leaf cuttings, longer length of leaf and high yield of fiber per acre.

It is suggested that species to have the best potentiality for fiber production be of the peltate type, or otherwise, and greater length of leaf.

1. Expt.: 47-1 Botanical Characteristics of Species
47-2 Percent Yield of Fiber as Related to Leaf Types
47-3 Acre Yield Characteristics of Species
47-4 Frost Injury Observations
47-5 Fiber Quality Studies
2. Location: Winchester Farm and Locations in South Florida
3. Soil: Sand and Peat Soils
4. Variety: a) S. Ehrenbergii
b) S. cylindrica
c) S. liberica
d) S. longiflora
e) S. guineensis
f) S. Laurentii
g) S. trifasciata
5. Design: Observation Plots

1. Right: 47-1-1: Benthic Characteristics of Species
47-1-2: Benthic Field of View as Related to Life Types
47-1-3: Area Field Characteristics of Species
47-1-4: Benthic Invertebrates
47-1-5: Benthic Quality Indices

2. Location: Benthic Field and Location in Benthic Field

3. Benthic Area and Benthic Area

4. Variations: a) B. Benthic Area

b) B. Benthic Area

c) B. Benthic Area

d) B. Benthic Area

e) B. Benthic Area

f) B. Benthic Area

g) B. Benthic Area

h. Benthic Area: Benthic Area

Observation Plantings of:

S. guineensis from Voss Farm of Hypoluxo, Florida

S. trifasciata from Mrs. Smith of Arcadia, Florida

S. Laurentii from Benson Farm, Boynton, Florida

S. longiflora from Sebring, Florida, intersection of So. Lakeview
Drive and Hickory Street

S. liberica from East Africa seed obtained by Edwards

S. cylindrica from Boynton, Florida

S. Ehrenbergii from Walsingham, Harvard University Gardens, Cuba

Observation Station 101

1. Colony - 1st year of breeding, Florida
2. Colony - 1st year of breeding, Florida
3. Colony - 1st year of breeding, Florida
4. Colony - 1st year of breeding, Florida
5. Colony - 1st year of breeding, Florida
6. Colony - 1st year of breeding, Florida
7. Colony - 1st year of breeding, Florida

<i>S. Ehrenbergii</i> *			<i>S. cylindrica</i>		
	Blade			Blade	
	Width	Length		Width	Length
1	1.6	31.0		0.8	38.0
2	1.0	29.0		1.3	29.0
3	1.0	30.0		1.1	24.0
4	1.3	29.0		1.1	38.0
5	2.1	35.0		0.9	23.0
6	2.5	37.0		1.0	24.0
7	1.0	29.5		1.0	29.9
8	1.1	29.5		1.0	31.2
9	1.3	29.0		1.0	28.4
10	1.0	31.0		1.0	23.0
Mean	1.4	31.0		1.0	29.0

<i>S. liberica</i>				<i>S. longiflora</i>			
	Petiole		Blade	Petiole	Blade		
	Length	Width			Width	Length	
1	3.0	3.3	26.0	9.0	4.5	20.0	
2	4.0	2.5	29.0	11.0	5.0	20.0	
3	3.0	3.2	23.0	8.5	4.0	25.5	
4	8.5	2.5	27.0	14.0	4.3	26.0	
5	6.5	3.2	27.0	12.5	4.5	25.5	
6	5.0	3.0	27.0	9.0	4.5	27.0	
7	4.5	3.5	27.5	13.0	4.0	29.0	
8	6.0	2.7	22.5	13.0	4.5	29.0	
9	4.0	2.5	24.0	16.0	4.5	29.0	
10	4.0	2.7	26.0	11.0	4.0	22.0	
Mean	4.9	2.8	30.8	11.7	4.4	25.1	

<i>S. guineensis</i>			<i>S. Laurentii</i>			<i>S. trifasciata</i>		
Petiole	Blade		Petiole	Blade		Petiole	Blade	
	Length	Width		Length	Width		Length	Width
14.0	4.0	24.0	24.0	3.0	25.5	28.0	2.8	26.5
21.0	2.0	29.0	25.0	3.1	24.0	30.0	2.3	23.0
13.5	4.0	22.0	29.0	2.0	19.0	41.0	2.0	22.5
14.5	4.0	25.0	17.5	3.3	24.5	34.0	2.1	21.0
13.0	3.5	20.5	22.5	2.1	23.5	38.0	2.2	24.5
13.0	3.3	13.5	25.0	2.3	23.0	34.5	2.3	25.0
13.0	3.5	19.5	22.0	2.5	22.0	34.5	2.0	29.5
17.0	3.5	15.5	20.0	3.0	22.0	37.0	2.0	21.0
16.0	2.5	19.0	21.0	2.3	22.0	21.5	2.5	29.5
14.5	3.3	24.0	21.0	2.5	26.0	38.0	2.5	22.0
M								
8								
a	15.0	3.3	21.2	22.7	3.5	23.3	33.7	2.3
n								23.6

*Observations Aug. 1950

Data Sheet 3 Sansevieria 47-1
Observations May 1950

Boynton

<i>S. Ehrenbergii</i>				<i>S. cylindrica</i>		
	Fibrous	Rhizomes		Fibrous	Rhizomes	
	roots	Width	Length	roots	Width	Length
1	19	0.8	8.0	8	0.6	7.0
2	23	0.9	11.0	26	1.0	6.5
3	35	0.8	9.0	18	0.9	8.1
4	15	0.9	5.0	19	0.6	11.0
5	12	0.9	8.5	22	0.8	3.5
6	21	0.6	10.0	15	0.7	9.5
7	18	0.4	9.6	14	0.7	6.0
8	16	0.7	10.4	38	0.6	8.5
9	13	0.5	8.3	20	0.5	5.0
10	28	0.5	11.7	10	0.5	6.0
Mean	20	0.7	8.6	19	0.7	7.1

<i>S. liberica</i>				<i>S. longiflora</i>		
	Fibrous	Rhizomes		Fibrous	Rhizomes	
	roots	Width	Length	roots	Width	Length
1	14	1.7	10.0	12	1.6	14.0
2	15	1.0	12.0	15	2.0	10.0
3	12	1.0	10.0	16	1.7	13.0
4	17	0.9	9.0	17	1.6	10.0
5	23	1.2	20.0	19	1.6	8.0
6	9	1.2	14.0	20	1.1	12.0
7	18	0.8	15.0	13	2.0	14.0
8	26	1.0	12.0	12	1.1	13.0
9	16	1.2	11.0	9	1.4	11.0
10	20	1.0	14.0	10	1.1	16.0
Mean	17	1.1	12.7	14	1.4	12.1

<i>S. guineensis</i>			<i>S. Laurentii (g)</i>			<i>S. trifasciata</i>		
Fibrous	Rhizomes		Fibrous	Rhizomes		Fibrous	Rhizomes	
roots	Width	Length	roots	Width	Length	roots	Width	Length
3	0.7	14.0	5	0.4	4.0	6	0.5	6.0
10	0.7	8.0	6	0.5	5.0	8	0.7	8.0
9	0.8	8.0	7	0.5	3.5	4	0.5	7.0
6	0.8	9.0	12	0.5	6.0	3	0.7	5.0
10	0.6	9.0	9	0.5	4.0	5	0.6	4.5
5	0.9	7.0	17	0.4	3.5	8	0.7	4.5
7	0.7	8.0	6	0.4	4.0	7	0.5	4.0
5	0.5	7.0	8	0.4	5.5	8	0.5	8.0
9	0.6	7.0	6	0.5	3.5	4	0.5	5.0
7	0.6	8.0	14	0.4	5.0	7	0.6	5.0
Mean	7	8.5	8	.5	4.5	6	0.6	6.7

Summary Sheet 1. *Sansevieria* 47-1 Boynton
Average Measurements in Inches of *Sansevieria* Species in Observation
Plots, Boynton, Florida

Sansevieria Species	Fibrous Roots	Rhizome Width Length		Petiole Length	Blade Width Length	
Group I						
<u>S. Ehrenbergii</u>	20	0.7	8.6	--	1.4	31.0
<u>S. cylindrica</u>	19	0.7	7.1	--	1.0	29.0
Group II						
<u>S. liberica</u>	17	1.1	12.7	4.9	2.8	26.0
<u>S. longiflora</u>	14	1.4	12.1	11.0	4.4	25.0
Group III						
<u>S. guineensis</u>	7	0.7	8.5	15.0	3.3	21.2
<u>S. Laurentii</u>	8	0.6	4.5	22.7	3.5	23.3
<u>S. trifasciata</u>	6	0.6	6.7	33.7	2.3	23.6

Summary of the *Stenotaphrum secundatum* (L.) Nees
 Average Measurements of Leaves of *Stenotaphrum secundatum* in
 Florida, Houston, Texas

Species	Number	Length	Width	Thickness	Weight	Area
Group I						
<i>S. secundatum</i>	20	0.7	0.8	--	--	31.0
<i>S. virginicum</i>	10	0.7	1.1	--	--	22.0
Group II						
<i>S. virginicum</i>	10	1.1	1.2	0.3	0.8	20.0
<i>S. virginicum</i>	10	1.1	1.1	0.3	0.8	20.0
Group III						
<i>S. virginicum</i>	7	0.7	0.8	0.3	0.8	21.0
<i>S. virginicum</i>	8	0.8	0.9	0.3	0.8	22.0
<i>S. virginicum</i>	8	0.8	0.9	0.3	0.8	22.0

Summary Sheet 1 Sansevieria 47-2 Boynton

Retted Dec. 1949, Decorticated May 1950. Approx. 3 yr. stand

	Decorticated Fiber				Retted Fiber			
	Base	Middle	Tip	byx	Base	Middle	Tip	byx
Group I <i>S. Ehrenbergii</i> - semi-round leaf								
y	1.44	1.85	2.24	0.41	1.57	1.63	1.96	0.27
x	0.30	1.42	2.18		0.58	1.00	2.08	
<i>S. cylindrica</i> - round leaf								
y	1.53	1.78	1.82	0.41	1.31	1.73	2.23	0.54
x	1.00	1.77	2.56		0.38	1.29	2.08	
Group II <i>S. liberica</i> - coriaceous leaf								
y	3.54	2.75	2.33	-0.69	3.07	2.88	2.49	-0.41
x	0.17	1.08	1.92		0.77	1.48	2.20	
<i>S. longiflora</i> - coriaceous leaf								
y	3.64	1.84	1.42	-1.06	3.63	1.93	1.21	-0.99
x	0.17	1.17	2.25		0.48	1.77	2.95	
Group III <i>S. guineensis</i> - intermediate leaf								
y	2.76	2.11	1.74	-0.60	2.95	2.12	1.54	-0.67
x	0.30	1.28	2.01		0.63	1.80	2.73	
<i>S. Laurentii</i> - petiolar leaf								
y	2.00	1.72	1.17	-0.46	1.72	1.19	0.88	-0.34
x	0.29	1.45	2.20		0.92	2.50	3.39	
<i>S. trifasciata</i> - petiolar leaf								
y	2.35	1.80	1.44	-0.27	2.45	1.80	1.38	-0.35
x	0.25	2.17	3.58		1.39	3.42	4.39	

y - % dry fiber per green weight of section
x - height of plant to mid-section
byx, regression of fiber on plant height

Vegetative Characteristics of Representative Species of Agronomic Groups of Sansevieria

Observations July 1950

Group I

Upright
cylindrical
leaf;
Small to
medium
rhizomes;
few shoots;
Long
fibrous
roots

Semi-round leaf

on short stem.....S. EhrenbergiiSmooth round leaf.....S. cylindrica

Group II

Flat
coriaceous
leaf;
Large rhizomes,
many shoots;
Long fibrous
roots

Flat dark green

very coriaceous

lightly mottled

leaves, very short

petiole.....S. liberica

Flat, dark green,

semi-coriaceous,

broad, distinctly

mottled leaf,

short petiole.....S. longiflora

Group III

Long
petiolar
leaf;
Small
rhizomes,
several shoots;
Short
fibrous
roots

Flat, light green

lightly mottled,

fibrous margined

leaf, medium petiole.....S. guineensis

Flat, narrow leaf,

medium green mottled,

non-fibrous margin,

long petiole.....S. Laurentii

Flat, narrow, dark green

distinctly mottled leaf

with non-fibrous margin

and very long petiole.....S. trifasciata

Data Sheet 1 *Sansevieria* 47-3
1948 harvest

Boynton

Average Height Inches	Leaves Sq. Ft. /20"	Cal. Acre Yield Tons Green Wt. -20	% Decort. Fiber	Dry Fiber #/a /20"	
<u>S. guineensis</u> - 2 year growth 32	12	---	67.84	1.60	2171
<u>S. trifasciata</u> - 3 year growth 50	34		259.28	1.48	7475
<u>S. longiflora</u> - 2 year growth 30	15	100.18	167.51	1.96	2646
<u>S. Laurentii</u> - 2 year growth 36	23		82.05	0.96	1591
<u>S. Laurentii</u> - 3 year growth 41	34		158.80	1.75	3970

Data Sheet 3 *Sansevieria* 47-3

1949 harvest

Boynton
Port Mayaca
Belle Glade

Plot No.	Age in Months	Total Leaves Sq. Ft.	Tons Green Wt./a /20"	% Decort. Fiber	Dry Fiber #/a /20"
<u><i>Sansevieria guineensis</i></u>					
(a) Leon fine sand					
1	36	41	119.79	1.63	3905
2	36	44	81.03	1.49	2435
(b) Everglades peat soil					
1	10	28	66.79	1.10	902
<u><i>Sansevieria trifasciata</i></u>					
(a) Leon fine sand					
1	48	89	436.51	1.44	12571
2	24	--	129.81	1.55	4024
3	24	73	102.80	1.56	3207
(b) Everglades peat soil					
1	10	38	54.74	0.88	963
(c) Davie fine sand					
1	18	33	85.88	1.09	1872
<u><i>Sansevieria longiflora</i></u>					
(a) Leon fine sand					
1	36	--	122.40	2.09	5116
2	36	30	136.78	1.99	5444
3	36	--	143.31	2.14	6134
(b) Everglades peat soil					
1	10	--	88.98	1.14	2029
<u><i>Sansevieria Laurentii</i></u>					
(a) Leon fine sand					
1	48	60	322.62	1.17	7549

10th Street
 10th Street
 10th Street

10th Street
 10th Street
 10th Street

No.	Date	Particulars	Debit	Credit	Balance
<u>General & Administrative</u>					
1		(a) Loan from bank		50.00	50.00
2					
3		(b) Exchange bank bill		50.00	100.00
4					
<u>General & Administrative</u>					
1		(a) Loan from bank		50.00	50.00
2					
3		(b) Exchange bank bill		50.00	100.00
4					
5		(c) Loan from bank		50.00	150.00
6					
7		(d) Exchange bank bill		50.00	200.00
8					
9		(e) Loan from bank		50.00	250.00
10					
<u>General & Administrative</u>					
1		(a) Loan from bank		50.00	50.00
2					
3		(b) Exchange bank bill		50.00	100.00
4					
5		(c) Loan from bank		50.00	150.00
6					
7		(d) Exchange bank bill		50.00	200.00
8					
9		(e) Loan from bank		50.00	250.00
10					
<u>General & Administrative</u>					
1		(a) Loan from bank		50.00	50.00
2					
3		(b) Exchange bank bill		50.00	100.00
4					
5		(c) Loan from bank		50.00	150.00
6					
7		(d) Exchange bank bill		50.00	200.00
8					
9		(e) Loan from bank		50.00	250.00
10					
<u>General & Administrative</u>					
1		(a) Loan from bank		50.00	50.00
2					
3		(b) Exchange bank bill		50.00	100.00
4					
5		(c) Loan from bank		50.00	150.00
6					
7		(d) Exchange bank bill		50.00	200.00
8					
9		(e) Loan from bank		50.00	250.00
10					

Data Sheet 4 Sansevieria 47-3
1950 harvest

Boynton

Average Height Inches	Leaves Sq. Ft. /20"	Cal. Acre Yield Tons Green Wt. -20 /20	% Decort. Fiber	Dry Fiber #/a /20"
31	<u>S. Ehrenbergii</u> - 2 year growth 3	-- 39.42	1.62	1277
29	<u>S. cylindrica</u> - 2 year growth 6	-- 34.62	1.32	914
30	<u>S. liberica</u> - 2 year growth 11	-- 63.46	2.36	2945
30	<u>S. longiflora</u> - 2 year growth 13	-- 86.15	1.79	3084
32	<u>S. guineensis</u> - 2 year growth 17	-- 67.33	1.56	2101
31	<u>S. guineensis</u> - 3 year growth 20	-- 100.41	1.56	3132
30	<u>S. trifasciata</u> - 15 month regrowth 77	72.60 77.44		
-20"	<u>S. trifasciata</u> - 3 year growth			
20-36"		159.72	1.36	4344
36 1/2"		94.38	1.50	2831
/20"				7175
-20"	<u>S. trifasciata</u> - 5 year growth			
20-36"		200.86	1.17	4700
36 1/2"		302.50	1.82	11011
/20"				15711

Fiber Yield Characteristics of Sansevieria species of Observation Plots
as Grown at Boynton, Florida

Age of Growth	Average Plant Height in Inches	Leaves Harvested Per Sq. Ft. (Over 20 Inches)	Computed Acre Yield Tons Green Wt.	Average Percent Decorti- cated Dry Fiber	Computed Acre Yields Pounds Dry Fiber	Annual Acre Yield, Pounds Dry Fiber
Group I						
			<u>S. Ehrenbergii</u>			
2 Year	31	3	39.42	1.62	1277	638
			<u>S. cylindrica</u>			
2 Year	29	6	34.62	1.32	914	457
Group II						
			<u>S. liberica</u>			
2 Year	30	11	63.46	2.36	2945	1497
			<u>S. longiflora</u>			
2 Year	30	13	86.15	1.79	3084	1542
3 Year	35	25	134.16	2.07	5554	1851
Group III						
			<u>S. guineensis</u>			
2 Year	32	17	67.33	1.56	2101	1050
3 Year	31	20	100.41	1.56	3132	1044
			<u>S. Laurentii</u>			
2 Year	36	23	82.05	0.96	1591	796
3 Year	41	34	158.80	1.25	3970	1323
			<u>S. trifasciata</u>			
2 Year	43	29	116.80	1.56	3615	1806
3 Year	50	34	259.28	1.48	7475	2491

Field Notes Characteristics of Summary of 1934 at University of Florida
as given at University of Florida

Age of Growth	Height in feet	Weight in pounds	Color of leaves	Color of flowers	Color of fruit	Color of seed	Color of shell
1 Year	1.5	1.5	Green	White	White	White	White
2 Year	2.0	2.0	Green	White	White	White	White
3 Year	2.5	2.5	Green	White	White	White	White
4 Year	3.0	3.0	Green	White	White	White	White
5 Year	3.5	3.5	Green	White	White	White	White
6 Year	4.0	4.0	Green	White	White	White	White
7 Year	4.5	4.5	Green	White	White	White	White
8 Year	5.0	5.0	Green	White	White	White	White
9 Year	5.5	5.5	Green	White	White	White	White
10 Year	6.0	6.0	Green	White	White	White	White
11 Year	6.5	6.5	Green	White	White	White	White
12 Year	7.0	7.0	Green	White	White	White	White
13 Year	7.5	7.5	Green	White	White	White	White
14 Year	8.0	8.0	Green	White	White	White	White
15 Year	8.5	8.5	Green	White	White	White	White
16 Year	9.0	9.0	Green	White	White	White	White
17 Year	9.5	9.5	Green	White	White	White	White
18 Year	10.0	10.0	Green	White	White	White	White
19 Year	10.5	10.5	Green	White	White	White	White
20 Year	11.0	11.0	Green	White	White	White	White
21 Year	11.5	11.5	Green	White	White	White	White
22 Year	12.0	12.0	Green	White	White	White	White
23 Year	12.5	12.5	Green	White	White	White	White
24 Year	13.0	13.0	Green	White	White	White	White
25 Year	13.5	13.5	Green	White	White	White	White
26 Year	14.0	14.0	Green	White	White	White	White
27 Year	14.5	14.5	Green	White	White	White	White
28 Year	15.0	15.0	Green	White	White	White	White
29 Year	15.5	15.5	Green	White	White	White	White
30 Year	16.0	16.0	Green	White	White	White	White
31 Year	16.5	16.5	Green	White	White	White	White
32 Year	17.0	17.0	Green	White	White	White	White
33 Year	17.5	17.5	Green	White	White	White	White
34 Year	18.0	18.0	Green	White	White	White	White
35 Year	18.5	18.5	Green	White	White	White	White
36 Year	19.0	19.0	Green	White	White	White	White
37 Year	19.5	19.5	Green	White	White	White	White
38 Year	20.0	20.0	Green	White	White	White	White
39 Year	20.5	20.5	Green	White	White	White	White
40 Year	21.0	21.0	Green	White	White	White	White
41 Year	21.5	21.5	Green	White	White	White	White
42 Year	22.0	22.0	Green	White	White	White	White
43 Year	22.5	22.5	Green	White	White	White	White
44 Year	23.0	23.0	Green	White	White	White	White
45 Year	23.5	23.5	Green	White	White	White	White
46 Year	24.0	24.0	Green	White	White	White	White
47 Year	24.5	24.5	Green	White	White	White	White
48 Year	25.0	25.0	Green	White	White	White	White
49 Year	25.5	25.5	Green	White	White	White	White
50 Year	26.0	26.0	Green	White	White	White	White
51 Year	26.5	26.5	Green	White	White	White	White
52 Year	27.0	27.0	Green	White	White	White	White
53 Year	27.5	27.5	Green	White	White	White	White
54 Year	28.0	28.0	Green	White	White	White	White
55 Year	28.5	28.5	Green	White	White	White	White
56 Year	29.0	29.0	Green	White	White	White	White
57 Year	29.5	29.5	Green	White	White	White	White
58 Year	30.0	30.0	Green	White	White	White	White
59 Year	30.5	30.5	Green	White	White	White	White
60 Year	31.0	31.0	Green	White	White	White	White
61 Year	31.5	31.5	Green	White	White	White	White
62 Year	32.0	32.0	Green	White	White	White	White
63 Year	32.5	32.5	Green	White	White	White	White
64 Year	33.0	33.0	Green	White	White	White	White
65 Year	33.5	33.5	Green	White	White	White	White
66 Year	34.0	34.0	Green	White	White	White	White
67 Year	34.5	34.5	Green	White	White	White	White
68 Year	35.0	35.0	Green	White	White	White	White
69 Year	35.5	35.5	Green	White	White	White	White
70 Year	36.0	36.0	Green	White	White	White	White
71 Year	36.5	36.5	Green	White	White	White	White
72 Year	37.0	37.0	Green	White	White	White	White
73 Year	37.5	37.5	Green	White	White	White	White
74 Year	38.0	38.0	Green	White	White	White	White
75 Year	38.5	38.5	Green	White	White	White	White
76 Year	39.0	39.0	Green	White	White	White	White
77 Year	39.5	39.5	Green	White	White	White	White
78 Year	40.0	40.0	Green	White	White	White	White
79 Year	40.5	40.5	Green	White	White	White	White
80 Year	41.0	41.0	Green	White	White	White	White
81 Year	41.5	41.5	Green	White	White	White	White
82 Year	42.0	42.0	Green	White	White	White	White
83 Year	42.5	42.5	Green	White	White	White	White
84 Year	43.0	43.0	Green	White	White	White	White
85 Year	43.5	43.5	Green	White	White	White	White
86 Year	44.0	44.0	Green	White	White	White	White
87 Year	44.5	44.5	Green	White	White	White	White
88 Year	45.0	45.0	Green	White	White	White	White
89 Year	45.5	45.5	Green	White	White	White	White
90 Year	46.0	46.0	Green	White	White	White	White
91 Year	46.5	46.5	Green	White	White	White	White
92 Year	47.0	47.0	Green	White	White	White	White
93 Year	47.5	47.5	Green	White	White	White	White
94 Year	48.0	48.0	Green	White	White	White	White
95 Year	48.5	48.5	Green	White	White	White	White
96 Year	49.0	49.0	Green	White	White	White	White
97 Year	49.5	49.5	Green	White	White	White	White
98 Year	50.0	50.0	Green	White	White	White	White
99 Year	50.5	50.5	Green	White	White	White	White
100 Year	51.0	51.0	Green	White	White	White	White

Plants Frozen Feb. 1947, Growth Observations Feb. 1948

	Not Cut		Cut	
	After Freeze		After Freeze	
	Plant	Leaves	Plant	Leaves
	Height	per	Height	per
		Sq. Ft.		Sq. Ft.
<u>S. guineensis</u>	28	10	30	18
<u>S. longiflora</u>	30	18	32	10
<u>S. trifasciata</u>	40	43		
<u>S. Laurentii</u>	42	38		

S. Laurentii and S. trifasciata were not severely frozen in February 1947. S. guineensis and S. longiflora were badly damaged.

Plots cut back recovered more rapidly than plots not cut back.

S. guineensis was also badly damaged in Feb. 1947 at Belle Glade, Ft. Myers and Bradenton. S. trifasciata and S. longiflora were completely frozen back at Belle Glade. S. trifasciata was not seriously injured at Port Mayaca or Boynton.

Table 1: Summary of Data for the period 1961-1962

Year	Month	1961		1962	
		Jan	Feb	Jan	Feb
1961	Jan	10	15	12	18
	Feb	15	20	18	25
1962	Jan	12	17	14	20
	Feb	17	22	19	26

Table 1: Summary of Data for the period 1961-1962

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FROST OBSERVATIONS, Field Trip to Boynton by J. F. Joyner and E. O. Gangstad, 29 December 50

Dog fennel completely killed at Belle Glade and Loxahatchee; moderate injury at Greenacres City and Boynton (Winchester Farm).

Moderate to heavy frost injury of Sansevieria guineensis (clean cultivation, moderate fertilization) at Boynton, frozen to ground at Belle Glade.

Observed frost injury - 1 year old stand, regrowth from 1949 harvest; height of plant and injury of leaf tip in inches at Boynton

	I		II		III	
	Height	Injury	Height	Injury	Height	Injury
1	31	15	33	18	36	13
2	31	15	28	20	36	6
3	29	21	25	15	35	11
4	28	17	22	17	34	3
5	28	17	22	13	31	8
6	27	15	22	12	29	9
7	26	13	22	10	27	7
8	25	15	21	13	27	6
9	23	14	21	3	25	5
10	23	13	20	10	24	7
Av.	27.1	15.5	23.6	13.1	30.4	7.5
%		57.2		55.5		24.7
Av. %						45.8

S. Laurentii - 1 year old established stand, harvested in 1949, height and frost injury of leaf tip in inches

	I		II		III	
	Height	Injury	Height	Injury	Height	Injury
1	25	0	24	0	27	0
2	24	0	22	0	26	0
3	24	0	20	0	26	0
4	23	0	21	0	26	0
5	23	0	21	0	26	0
6	23	0	21	0	26	0
7	23	0	20	0	25	0
8	23	2	20	0	25	0
9	21	0	20	0	24	0
10	21	0	20	0	23	0
Av.	23.0	0.2	20.9	0.0	25.4	0.0
%		0.9		0.0		0.0
Av. %						0.3

STORY OF THE BOYNTON FIELD TRIP TO BOYNTON BY J. F. BOYNTON AND H. G. BOYNTON, 23 December 1914

The following is a list of the birds and mammals which were taken during the trip to Boynton (Hutchinson, Kans.).

The following is a list of the birds and mammals which were taken during the trip to Boynton (Hutchinson, Kans.).

Observed birds and mammals - 1 year old birds, mammals from 1914

I		II		III	
Weight	Length	Weight	Length	Weight	Length
1	21	18	24	18	26
2	21	18	24	18	26
3	21	18	24	18	26
4	21	18	24	18	26
5	21	18	24	18	26
6	21	18	24	18	26
7	21	18	24	18	26
8	21	18	24	18	26
9	21	18	24	18	26
10	21	18	24	18	26
11	21	18	24	18	26
12	21	18	24	18	26
13	21	18	24	18	26
14	21	18	24	18	26
15	21	18	24	18	26
16	21	18	24	18	26
17	21	18	24	18	26
18	21	18	24	18	26
19	21	18	24	18	26
20	21	18	24	18	26
21	21	18	24	18	26
22	21	18	24	18	26
23	21	18	24	18	26
24	21	18	24	18	26
25	21	18	24	18	26
26	21	18	24	18	26
27	21	18	24	18	26
28	21	18	24	18	26
29	21	18	24	18	26
30	21	18	24	18	26
31	21	18	24	18	26
32	21	18	24	18	26
33	21	18	24	18	26
34	21	18	24	18	26
35	21	18	24	18	26
36	21	18	24	18	26
37	21	18	24	18	26
38	21	18	24	18	26
39	21	18	24	18	26
40	21	18	24	18	26
41	21	18	24	18	26
42	21	18	24	18	26
43	21	18	24	18	26
44	21	18	24	18	26
45	21	18	24	18	26
46	21	18	24	18	26
47	21	18	24	18	26
48	21	18	24	18	26
49	21	18	24	18	26
50	21	18	24	18	26
51	21	18	24	18	26
52	21	18	24	18	26
53	21	18	24	18	26
54	21	18	24	18	26
55	21	18	24	18	26
56	21	18	24	18	26
57	21	18	24	18	26
58	21	18	24	18	26
59	21	18	24	18	26
60	21	18	24	18	26
61	21	18	24	18	26
62	21	18	24	18	26
63	21	18	24	18	26
64	21	18	24	18	26
65	21	18	24	18	26
66	21	18	24	18	26
67	21	18	24	18	26
68	21	18	24	18	26
69	21	18	24	18	26
70	21	18	24	18	26
71	21	18	24	18	26
72	21	18	24	18	26
73	21	18	24	18	26
74	21	18	24	18	26
75	21	18	24	18	26
76	21	18	24	18	26
77	21	18	24	18	26
78	21	18	24	18	26
79	21	18	24	18	26
80	21	18	24	18	26
81	21	18	24	18	26
82	21	18	24	18	26
83	21	18	24	18	26
84	21	18	24	18	26
85	21	18	24	18	26
86	21	18	24	18	26
87	21	18	24	18	26
88	21	18	24	18	26
89	21	18	24	18	26
90	21	18	24	18	26
91	21	18	24	18	26
92	21	18	24	18	26
93	21	18	24	18	26
94	21	18	24	18	26
95	21	18	24	18	26
96	21	18	24	18	26
97	21	18	24	18	26
98	21	18	24	18	26
99	21	18	24	18	26
100	21	18	24	18	26

Observed birds and mammals - 1 year old birds, mammals from 1914

I		II		III	
Weight	Length	Weight	Length	Weight	Length
1	21	18	24	18	26
2	21	18	24	18	26
3	21	18	24	18	26
4	21	18	24	18	26
5	21	18	24	18	26
6	21	18	24	18	26
7	21	18	24	18	26
8	21	18	24	18	26
9	21	18	24	18	26
10	21	18	24	18	26
11	21	18	24	18	26
12	21	18	24	18	26
13	21	18	24	18	26
14	21	18	24	18	26
15	21	18	24	18	26
16	21	18	24	18	26
17	21	18	24	18	26
18	21	18	24	18	26
19	21	18	24	18	26
20	21	18	24	18	26
21	21	18	24	18	26
22	21	18	24	18	26
23	21	18	24	18	26
24	21	18	24	18	26
25	21	18	24	18	26
26	21	18	24	18	26
27	21	18	24	18	26
28	21	18	24	18	26
29	21	18	24	18	26
30	21	18	24	18	26
31	21	18	24	18	26
32	21	18	24	18	26
33	21	18	24	18	26
34	21	18	24	18	26
35	21	18	24	18	26
36	21	18	24	18	26
37	21	18	24	18	26
38	21	18	24	18	26
39	21	18	24	18	26
40	21	18	24	18	26
41	21	18	24	18	26
42	21	18	24	18	26
43	21	18	24	18	26
44	21	18	24	18	26
45	21	18	24	18	26
46	21	18	24	18	26
47	21	18	24	18	26
48	21	18	24	18	26
49	21	18	24	18	26
50	21	18	24	18	26
51	21	18	24	18	26
52	21	18	24	18	26
53	21	18	24	18	26
54	21	18	24	18	26
55	21	18	24	18	26
56	21	18	24	18	26
57	21	18	24	18	26
58	21	18	24	18	26
59	21	18	24	18	26
60	21	18	24	18	26
61	21	18	24	18	26
62	21	18	24	18	26
63	21	18	24	18	26
64	21	18	24	18	26
65	21	18	24	18	26
66	21	18	24	18	26
67	21	18	24	18	26
68	21	18	24	18	26
69	21	18	24	18	26
70	21	18	24	18	26
71	21	18	24	18	26
72	21	18	24	18	26
73	21	18	24	18	26
74	21	18	24	18	26
75	21	18	24	18	26
76	21	18	24	18	26
77	21	18	24	18	26
78	21	18	24	18	26
79	21	18	24	18	26
80	21	18	24	18	26
81	21	18	24	18	26
82	21	18	24	18	26
83	21	18	24	18	26
84	21	18	24	18	26
85	21	18	24	18	26
86	21	18	24	18	26
87	21	18	24	18	26
88	21	18	24	18	26
89	21	18	24	18	26
90	21	18	24	18	26
91	21	18	24	18	26
92	21	18	24	18	26
93	21	18	24	18	26
94	21	18	24	18	26
95	21	18	24	18	26
96	21	18	24	18	26
97	21	18	24	18	26
98	21	18	24	18	26
99	21	18	24	18	26
100	21	18	24	18	26

Data Sheet 3 Sansevieria 47-4
Frost Observations 29 Dec. 50

Boynton

S. longiflora - 1 year old, established stand, harvested in 1949, height and frost injury of leaf tips in inches.

	I		II		III	
	Height	Injury	Height	Injury	Height	Injury
1	33	0	34	0	32	0
2	33	0	33	0	30	0
3	32	0	29	0	30	0
4	31	0	29	0	30	2
5	31	0	29	0	29	0
6	30	2	28	0	29	0
7	30	2	28	0	27	0
8	30	0	26	5	27	0
9	29	0	25	0	27	0
10	28	0	24	12	25	0
Av.	30.7	0.4	26.5	1.7	28.6	0.2
%		1.3		6.4		0.7
Av. %						2.8

S. trifasciata - 1 year old established stand, harvested in 1949, height and frost injury of leaf tip in inches

	I		II		III	
	Height	Injury	Height	Injury	Height	Injury
1	33	0	32	0	34	0
2	33	0	30	0	33	0
3	32	0	30	0	29	0
4	31	0	30	2	29	0
5	31	0	29	0	29	0
6	30	0	29	0	28	0
7	30	2	27	0	29	0
8	30	2	27	0	26	5
9	29	0	27	0	25	0
10	28	0	25	0	24	12
Av.	30.7	0.4	28.6	0.2	28.5	1.7
%		1.3		0.7		6.0
Av. %						2.7

Table 1 - ...

...	...	...	...	...	...
1	...	...	...	...	...
2	...	...	...	...	...
3	...	...	...	...	...
4	...	...	...	...	...
5	...	...	...	...	...
6	...	...	...	...	...
7	...	...	...	...	...
8	...	...	...	...	...
9	...	...	...	...	...
10	...	...	...	...	...
Av.	...	...	...	...	...
X	...	...	...	...	...
...	...	...	...	...	...

Table 2 - ...

...	...	...	...	...	...
1	...	...	...	...	...
2	...	...	...	...	...
3	...	...	...	...	...
4	...	...	...	...	...
5	...	...	...	...	...
6	...	...	...	...	...
7	...	...	...	...	...
8	...	...	...	...	...
9	...	...	...	...	...
10	...	...	...	...	...
Av.	...	...	...	...	...
X	...	...	...	...	...
...	...	...	...	...	...

Summary Sheet 1 Sansevieria 47-5

Sansevieria Species	Location	Treatment	#/Sq. Inch 0.5 in. Break
<u>S. guineensis</u>	Boynton	Cult. Fert.	78,974
"	Palmetto	Cult. Fert.	68,306
"	Ft. Myers	Cult. Fert.	65,938
"	Ft. Myers	Cult. Not. Fert.	62,814
"	Terra Ceia Island	Old Leaves Wild Plants	53,918
<u>S. trifasciata</u>	Bradenton	Wild Plants in Shade	73,714

Sansevieria Species	Location	#/Sq. In. 3 In. Break	Fiber Count
<u>S. guineensis</u>	Boynton	38.6	94.2
<u>S. intermedia</u>	Boynton	38.0	80.2
<u>S. cylindrica</u>	Boynton	50.2	104.1
<u>S. longiflora</u>	Boynton	50.2	84.0
<u>S. Laurentii (g)</u>	Boynton	54.4	102.7
<u>S. Laurentii (y)</u>	Boynton	56.0	92.5
<u>S. trifasciata</u>	Boynton	51.0	75.8

Sansevieria Species	Treatment	#/Sq. In. 3 In. Break	#/Sq. In. Knot Strength
<u>S. guineensis</u>	No mulch		
"	Short leaves	46,458	15,358
"	Mulch		
"	Short leaves	47,088	14,328
"	Wide leaves	59,014	14,486
"	Medium leaves	55,109	15,967
"	Narrow leaves	55,392	14,175
"	2nd growth	47,851	11,524
<u>S. Longiflora</u>	Short Leaves	54,332	14,496
	Long leaves	55,088	20,425
<u>S. trifasciata</u>	Short leaves	54,095	17,415
	Long leaves	51,919	12,426

Project G-5-0 Sansevieria 48-1-7

Object of Expt.: Quality studies of sansevieria fiber

Outline of Expt.: Observation plots at Boynton

- 48-1 Effect of age and species
- 48-2 Effect of climate and soil
- 48-3 Effect of cultural treatments
- 48-4 Effect of fertility treatments
- 48-5 Effect of Ca, N, P, K fertilization
- 48-6 Deterioration due to storage
- 48-7 Comparison of fiber type and use

Abstract of Results:

Differences of quality of species grown at the same location are not particularly large. S. guineensis tends to have the poorest quality and S. Laurentii the highest. Tensile strength increases to a point then deteriorates slowly with age. High nitrogen and a warm climate tend to reduce the strength. Of the period studied, flex life increased with age and with cool conditions of growth. Cultural and fertility treatments did not significantly affect quality but there is a trend to reduce strength with high N fertilization. There was no apparent loss of quality in a two year period of storage. In a longer period of storage, tensile strength, knot strength and flex life were considerably reduced. Abrasion resistance was little changed. In a comparison of quality of fiber types it is found that high knot strength is a quality which differentiates the textile fibers from the high grade cordage fibers. Abrasion resistance and flex life are qualities characteristic of the particular fiber types. Furcraea has high abrasion resistance. Sansevieria has high flex life.

Tensile strength of sansevieria species from observation plots at
Boynton, Florida

Sansevieria Species	Tensile Strength, 1000# per square inch*		
	3 inch	$\frac{1}{4}$ inch	$\frac{1}{8}$ inch
1946 Harvest, 1 year stand			
<u>S. cylindrica</u>	42,238		
<u>S. guineensis</u>	53,566		
<u>S. trifasciata</u>	55,278		
<u>S. longiflora</u>	57,237		
<u>S. Laurentii</u>	62,198		
Average	54,103		
1947 Harvest, 2 year stand			
<u>S. cylindrica</u>	50,000		
<u>S. guineensis</u>	38,600		
<u>S. longiflora</u>	50,200		
<u>S. trifasciata</u>	51,000		
<u>S. Laurentii</u>	56,000		
1948 Harvest, 3 year stand			
<u>S. cylindrica</u>	52,500		52,400
<u>S. guineensis</u>	42,900		55,200
<u>S. longiflora</u>	44,300		45,500
<u>S. trifasciata</u>	45,800		52,200
<u>S. Laurentii</u>	46,400		50,500
Average Values			
<u>S. cylindrica</u>	48,246		
<u>S. guineensis</u>	45,022		
<u>S. trifasciata</u>	50,927		
<u>S. longiflora</u>	50,745		
<u>S. Laurentii</u>	54,866		

*Average of 20 breaks, Fiber Testing Laboratory, Beltsville, Md.

Fiber Quality Tests Made During 1947-48-49. Sansevieria Species in
Observation Plots at Boynton, Florida

Age of Plot	Tensile Strength lbs. per sq. in.	Knot Strength lbs. per sq. in.	Abrasion Resistance Cycles to Failure	Flex Life Cycles to Failure
<u>S. longiflora</u>				
2 year	63,200	15,800	2029	10,982
3 year	65,300	20,400	773*	12,896
4 year	64,700	19,800	3492	20,072
<u>S. guineensis</u>				
2 year	57,200	14,200	475	3,705
3 year	62,500	16,500	616	12,548
4 year	51,800	14,500	838	12,836
<u>S. Laurentii</u>				
2 year	64,300	13,500	436	4,960
3 year	70,400	16,200	1411	18,630
4 year	64,000	17,200	2338	10,484
<u>S. trifasciata</u>				
2 year	65,300	13,000	688	4,585
3 year	64,000	15,800	1377	8,918
4 year	60,100	15,700	1747	10,320
Average of Tests				
<u>S. longiflora</u>	64,440	18,666	2,761	14,650
<u>S. guineensis</u>	57,166	15,066	643	9,696
<u>S. Laurentii</u>	66,230	15,633	1,395	8,025
<u>S. trifasciata</u>	63,130	14,833	1,271	7,941
2 yr. av.	62,500	14,125	907	6,058
3 yr. av.	65,550	17,225	1,491	10,748
4 yr. av.	60,150	16,800	2,104	13,428

*Omitted from average

Tensile strength, 1/2 inch span, SS abrasion twist
 Tests supplied by Fiber Testing Laboratory, Everglades Experiment
 Station, Belle Glade, Fla.

Remarks: S. Laurentii observed is strongest and S. guineensis is
 weakest. Lower decrease with age than in Beltsville tests

Data Sheet 3 Sansevieria 48-1

Boynton

1949 Harvest - 1950 Tests

Laboratory	Area .00001	Strength (Break Value)	Strength (1000 lbs PSI)
Samples Prepared in Florida			
1/2 inch break, <u>S. longiflora</u>			
Beltsville	147	88	60.0
Belle Glade	131	85	64.7
1/2 inch break, <u>S. Laurentii</u>			
Beltsville	150	84	56.2
Belle Glade	139	89	64.0
1/2 inch break, <u>S. trifasciata</u>			
Beltsville	152	82	54.2
Belle Glade	144	86	60.1
1/2 inch, Av. 60 breaks			
Beltsville	150	85	56.8
Belle Glade	138	87	62.9
Samples Prepared at Beltsville			
3 inch, Av. 20 breaks			
Beltsville	160.5	81	50.3
Belle Glade	126.6	73	58.0

Remarks: Differences between laboratories largely due to diametric measurements, probably due to instruments

Summary Sheet 1 Sansevieria 48-1

Boynton

Testing Laboratory	Sansevieria Species	Tensile Strength	
		3 inch	$\frac{1}{2}$ inch
1947 Harvest			
Beltsville	<u>S. guineensis</u>	38,600	
Belle Glade	" "		57,200
Beltsville	<u>S. trifasciata</u>	51,000	
Belle Glade	" "		65,300
Beltsville	<u>S. longiflora</u>	50,800	
Belle Glade	" "		63,200
Beltsville	<u>S. Laurentii</u>	56,000	
Belle Glade	" "		64,300
1948 Harvest			
Beltsville	<u>S. guineensis</u>	42,900	55,200
Belle Glade	" "		62,500
Beltsville	<u>S. trifasciata</u>	45,800	52,200
Belle Glade	" "		64,000
Beltsville	<u>S. longiflora</u>	44,300	45,500
Belle Glade	" "		65,300
Beltsville	<u>S. Laurentii</u>	46,400	50,500
Belle Glade	" "		70,400
1949 Harvest			
Beltsville	<u>S. guineensis</u>		51,800
Belle Glade	" "		
Beltsville	<u>S. trifasciata</u>		54,200
Belle Glade	" "		60,100
Beltsville	<u>S. longiflora</u>		60,000
Belle Glade	" "		64,700
Beltsville	<u>S. Laurentii</u>		56,200
Belle Glade	" "		64,000

Summary Sheet 2 Sansevieria 48-1

Boynton

Breaking strength of sansevieria fiber $3\frac{1}{2}$ year plot

Leaf	Longiflora	Laurentii	Trifasciata	Guineensis
I				
a	82.2	86.6	81.4	55.6
b	76.6	75.2	72.8	64.8
c	84.6	70.4	76.8	69.4
Sum	243.4	232.2	231.0	189.8
II				
a	77.4	77.2	80.2	78.0
b	83.0	71.0	78.2	81.8
c	78.2	74.0	72.0	75.6
Sum	238.6	215.2	230.4	235.4
III				
a	79.0	92.0	72.0	76.4
b	76.8	60.0	82.8	73.6
c	73.6	77.4	82.0	82.0
Sum	229.4	226.4	236.8	232.0
IV				
a	83.0	104.0	82.0	81.2
b	82.6	93.4	74.4	57.0
c	71.0	83.0	78.6	73.4
Sum	236.6	280.4	235.0	211.6
Var.	948.0	954.2	933.2	868.8

Distribution of Error Variance			
Source	DF	SS	V
Total	47	3,347.80	
Varieties	3	383.58	127.86
Within Leaves	12	1,315.75	109.65
Within Samples	32	1,675.47	52.36

Remarks: Variation due to leaf sample is greater than lab sample

Effect of Climate and Soil on Fiber Quality

Location	Tensile Strength lbs. per sq. in.	Knot Strength lbs. per sq. in.	Abrasion Resistance Cycles to Failure	Flex Life Cycles to Failure
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Cultivated, warm area, sandy soil

Boynton	58,400	14,900	571	8,775
Ft. Myers	55,500	12,700	2,222	8,255
	56,920	13,800	1,397	8,515

Wild stand, warm area, sandy soil

Bradenton	54,500	12,900	1,645	16,483
Boynton	51,200	14,400	2,206	8,369
	52,850	13,650	1,926	12,426

Wild stand, moderately warm area, sandy soil

Arcadia	54,000	15,500	1,137	11,923
Sebring	50,200	15,500	2,775	22,280
	52,100	15,500	1,856	17,102

Wild stand, cold area, sandy soil

Micco	57,500	16,900	2,432	14,010
Okeechobee	50,700	16,300	2,125	20,434
	54,100	16,600	2,279	17,222

Wild stand, cold area, muck soil

Moore Haven	41,400	10,800	2,290	16,561
Belle Glade	40,200	11,300	2,553	23,574
	40,800	11,050	2,421	20,067

Tests by Fiber Laboratory, Belle Glade. T.S., 20 breaks, 6 determinations for abrasion and flex.

Remarks: Low tensile strength at Belle Glade
Low flex life at Boynton

Tensile strength tests of sansevieria fertility plots

Fert.	Boynton		Fert	Fort Myers	
	Rate	T.S. $\frac{1}{2}$ "		T.S.3"	Manatee T.S.3"
Check	0	51.7	Check	53.6	45.3
	0	52.1		56.8	44.8
	0	50.0		50.7	50.3
Av.		51.2	Av.	53.7	46.8
4-7-5	50	56.9	1000	55.5	53.7
lbs.	100	59.4	lbs.	57.2	41.6
N	150	52.9	4-7-5	54.5	49.6
Av.		53.0	Av.	58.7	48.3
NaNO ₃	50	59.1	2000	53.8	50.4
lbs.	100	56.4	lbs.	53.6	55.9
N	150	52.3	4-7-5	56.9	50.8
Av.		55.9	Av.	54.8	52.4
NH ₄ NO ₃	50	59.9	3000	59.3	50.4
lbs.	100	60.2	lbs.	49.6	45.9
N	150	56.2	4-7-5	48.4	50.8
Av.		58.7	Av.	52.4	49.0
Uramon	50	58.8	Uramon	60.0	54.5
lbs.	100	57.4	120#	60.4	48.2
N	150	58.6	N	56.9	45.5
Av.		58.4	Av.	59.1	49.4
		N.S.		N.S.	N.S.

Data Sheet 1 Sansevieria 48-4

Fort Myers, Fla.

Fiber Quality Data of Fertility Trial

Treatment	Tensile Strength lbs. per sq. in.	Knot Strength lbs. per sq. in.	Abrasion Resistance Cycles to Failure	Flex Life Cycles to Failure
Check	46,800	13,600	1,234	7,253
	58,200	10,900	2,472	10,897
	56,000	14,100	1,647	7,502
	53,667	12,867	1,784	8,551
1000#/a	48,400	12,200	2,527	8,534
4-7-5	54,600	12,500	1,266	6,717
Fert.	62,600	15,800	5,140	9,548
	55,200	13,500	2,978	8,266
2000#/a	59,600	12,800	1,382	7,670
4-7-5	57,400	12,700	5,119	9,188
Fert.	56,200	11,900	2,739	10,763
Peas	53,200	14,300	412	6,899
Cover	56,600	10,800	1,876	5,378
Crop	59,900	11,400	6,272	15,178
	56,576	12,167	2,853	9,152
Uramon	58,100	12,600	519	6,563
120#N	61,000	12,700	1,927	8,415
	46,100	11,900	2,488	7,402
	55,066	12,400	1,645	7,457
3000#/a	55,400	12,200	1,460	8,590
4-7-5	55,400	15,100	884	7,478
Fert.	53,800	10,400	645	4,260
	54,867	12,567	996	6,896
	N.S.	N.S.	N.S.	N.S.

Remarks: High nitrogen tends to reduce fiber quality

Summary Sheet 1 Sansevieria 48-5

Boynton

Fiber quality of fertilizer rate experiments, 1949 harvest season, of
S. guineensis

Treatment	Tensile Strength lbs. per sq. in.	Knot Strength lbs. per sq. in.	Abrasion Resistance Cycles to Failure	Flex Life Cycles to Failure
Control	58,033	13,500	3,409	11,957
Ca 500#/a	59,500	13,733	2,519	9,660
Ca 2000#/a	57,533	14,066	3,299	7,104
N 40#/a	53,866	13,333	2,436	11,972
N 120#/a	52,766	13,700	2,474	13,477
P 40#/a	51,666	12,966	2,502	12,174
P 80#/a	53,733	12,500	2,047	14,932
K 40#/a	58,700	13,333	2,073	11,008
K 80#/a	56,166	12,087	1,724	11,971
	N.S.	N.S.	N.S.	N.S.

NPK = 8-8-8 unless otherwise noted.

Tensile knot strength, average of 30 breaks

Abrasion and flex, average of 6 determinations

Summary Sheet 1 Sansevieria 48-6

Belle Glade

Storage samples of S. guineensis in laboratory*

Age of Sample Months	Tensile Strength lbs. per sq. in.	Knot Strength lbs. per sq. in.	Abrasion Resistance Cycles to Failure	Flex Life Cycles to Failure
0	55,911	19,610	901	15,034
6	50,700	15,900	2,460	7,290
9	56,100	14,500	6,483*	2,858
Average	54,237	16,670	1,680	8,304
15	57,700	13,900	1,607	4,905
16	55,400	13,000	617	7,516
18	60,400	16,200	2,119	11,744
Average	57,833	14,366	1,448	8,055

*Omitted from average

Remarks: No apparent loss of quality over 18 month period

*Data supplied by Mills H. Byrom

Fiber Quality Tests of Stored Samples of Sansevieria Fiber

Sansevieria Species	Years Stored	Tensile Strength 1000# per sq. in.	Knot Strength 1000# per sq. in.	Abrasion Resistance Cycles to Failure	Flex Life Cycles to Failure
<u>S. cylindrica</u>	0	54.4	13.4	290	4,687
<u>S. Ehrenbergii</u>	44*	19.0	8.7	247	-
% Loss		65.1	35.1	14.8	
<u>S. longiflora</u>	0	64.4	18.7	2098	14,650
<u>S. Stuckii</u>	17*	42.2	10.4	2003	5,825
% Loss		34.4	44.4	4.5	60.0
<u>S. trifasciata</u>	0	63.1	14.8	1271	7,941
<u>S. trifasciata</u>	28*	46.2	12.3	1324	3,608
% Loss		26.8	16.9	0.0	54.6
Av. % Loss	30	42.1	32.1	6.4	57.3

*Data supplied by Dr. B. B. Robinson. Fiber samples stored at room conditions at Washington, D. C. Tensile strength under 1/2 inch span, SS abrasion twist.

1. The first part of the report is a general statement of the work done during the year.
 2. The second part is a detailed account of the work done in each of the several departments.
 3. The third part is a summary of the results of the work done during the year.
 4. The fourth part is a statement of the financial condition of the institution.
 5. The fifth part is a statement of the property of the institution.
 6. The sixth part is a statement of the personnel of the institution.
 7. The seventh part is a statement of the curriculum of the institution.
 8. The eighth part is a statement of the methods of instruction.
 9. The ninth part is a statement of the results of the instruction.
 10. The tenth part is a statement of the future plans of the institution.

Statement of the Financial Condition of the Institution				
Assets	Liabilities	Capital	Reserve	Surplus
1. Cash	1. Cash	1. Cash	1. Cash	1. Cash
2. Bonds	2. Bonds	2. Bonds	2. Bonds	2. Bonds
3. Stocks	3. Stocks	3. Stocks	3. Stocks	3. Stocks
4. Real Estate	4. Real Estate	4. Real Estate	4. Real Estate	4. Real Estate
5. Other Assets	5. Other Assets	5. Other Assets	5. Other Assets	5. Other Assets
6. Total Assets	6. Total Liabilities	6. Total Capital	6. Total Reserve	6. Total Surplus
7. Cash	7. Cash	7. Cash	7. Cash	7. Cash
8. Bonds	8. Bonds	8. Bonds	8. Bonds	8. Bonds
9. Stocks	9. Stocks	9. Stocks	9. Stocks	9. Stocks
10. Real Estate	10. Real Estate	10. Real Estate	10. Real Estate	10. Real Estate
11. Other Assets	11. Other Assets	11. Other Assets	11. Other Assets	11. Other Assets
12. Total Assets	12. Total Liabilities	12. Total Capital	12. Total Reserve	12. Total Surplus

The above statement is a true and correct statement of the financial condition of the institution as of the date of the statement.
 It is signed by the President of the institution, and attested by the Secretary.
 Witness my hand and seal this 1st day of January, 1901.

Summary Sheet 1 Sansevieria 48-7

Belle Glade

Mean values of fiber quality tests of ramie, flax, abaca, sansevieria, sisal, kenaf and furcraea 1/

Description	Tensile Strength 1000 lbs. sq. in.	Knot Strength 1000 lbs. sq. in.	Abrasion Resistance 1000 Cycles to Failure	Flex Life 1000 Cycles to Failure
High tensile strength, high knot strength:				
Ramie	67.4	33.0	0.3	11.8
Flax	52.9	29.8	0.4	4.8
High tensile strength, low knot strength:				
Abaca	75.7	18.7	0.7	0.7
Sansevieria <u>2/</u>	59.5	15.9	1.2	9.4
Sisal	57.1	16.1	1.3	2.0
Low tensile strength, low knot strength:				
Kenaf	34.4	17.6	0.2	1.2
Furcraea <u>3/</u>	32.5	14.4	3.9	3.4

1/ Means of 60 or more independent observations covering the general range of quality of each fiber, with 3-inch span for tensile strength and SS twist for abrasion resistance.

2/ Average of S. longiflora, S. guineensis, S. Laurentii, S. trifasciata, all Florida-grown

3/ Furcraea gigantea grown at Fort Myers, Fla.

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF THE HISTORY OF ARTS AND ARCHITECTURE

THE HISTORY OF ARTS AND ARCHITECTURE

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The Vegetative Propagation of Sansevieria

J. FRANK JOYNER, EDWARD O. GANGSTAD, AND CHARLES C. SEALE

The Vegetative Propagation of *Sansevieria*¹

J. FRANK JOYNER, EDWARD O. GANGSTAD, AND CHARLES C. SEALE²

SANSEVIERIA fibers commonly known as "bow-string hems" have at various times entered the cordage markets as substitutes for Abacá, *Musa textilis*, Née, and for specialized purposes. The fineness, strength, uniformity, and quality of the fiber varies with the individual species and with the particular conditions of growth and preparation. Until a high quality standardized product can be offered in substantial quantities, the commercial market is likely to remain uncertain.

The work reported herein is a preliminary part of studies on sansevieria undertaken during World War II for the domestic production of hard fibers. The investigations are largely limited to *Sansevieria guineensis*, *S. trifasciata*, *S. longiflora*, and *S. Laurentii* (1). These species are typically flat leaved, a characteristic associated with a fine uniform and easily cleaned fiber (2). They were introduced into Florida during colonial times and have escaped to the wild in many different places (3). Because these species appear to be fairly well adapted to the climate and soils of southern Florida and because the fiber may be easily and inexpensively prepared, the economic production of sansevieria as a highly mechanized industry has potential possibilities (4).

Most species of sansevieria can be propagated by seed, rhizomes, and leaf cuttings. *S. trifasciata* and *S. longiflora* readily produce seed, but *S. Laurentii* rarely produces seed and no viable seeds have been obtained from *S. guineensis*. The necessity of gathering the seed by hand and the low yield per plant make it uneconomical to propagate sansevieria in this manner. Vegetative cuttings must be used for commercial plantings.

When the rhizomes as well as the seed of sansevieria species are planted, a juvenile rosette type of plant is first produced. As this leaf matures, "character" or upright leaves develop. It is the upright leaf which is valuable for its fiber. If leaf cuttings are planted instead of seed or rhizomes, the fiber plant is usually produced without going through the rosette stage. The more basal leaf cuttings do, however, produce some rosette plants and others that are intermediate between the rosette and the fiber type. A juvenile rosette and a young fiber plant of *S. trifasciata* of approximately the same age are shown in Fig. 1.

The leaf cuttings of sansevieria are highly polar and must be planted with the basal portion in the ground.

¹Studies of the Division of Cotton and Other Fiber Crops and Diseases, B. P. I. S. A. E., A. R. A., U. S. D. A., with the Division of Agricultural Engineering, Florida Everglades Experiment Station, and Mr. Oscar R. Winchester, Boynton, Fla., cooperating. Published with the approval of the Chief, B. P. I. S. A. E., and the Vice Director of the Florida Everglades Experiment Station. Received for publication June 13, 1950.

²Sansevieria Specialist and Agent of the Division of Cotton and Other Fiber Crops and Diseases, and Associate Agronomist, Everglades Experiment Station, University of Florida, Belle Glade, Fla., respectively.



FIG. 1.—Left, a rosette plant produced from a rhizome of *Sansevieria trifasciata*. Right, a fiber plant produced from a leaf cutting of the same species, approximately the same age.

If the tip is put in the ground, roots do not form. Rooting is normally slow and requires a considerable period of time. A more rapid and prolific growth of roots may be had by suitable hormone treatment. Table 1 gives the results obtained with several root hormones. Cuttings immersed in 50 ppm of indoleacetic acid for 1 hour gave the best rooting.

TABLE 1.—The effect of rooting hormones on the growth of roots of *Sansevieria guineensis* cuttings

Treatment	Roots per cutting			
	1	2	3	Av.
Indolebutyric acid 50 ppm 1 hr.	5	4	3	4.3
4 hr.	2	20	9	10.3
Indolebutyric acid 100 ppm. 1 hr.	5	0	5	3.3
4 hr.	6	7	5	6.0
Indoleacetic acid 50 ppm 1 hr.	45	30	35	36.7
4 hr.	10	15	35	20.0
Indoleacetic acid 100 ppm 1 hr.	22	25	23	23.3
4 hr.	8	9	10	9.3
Lanolin paste of 50 mg indolebutyric acid per gram of lanolin.	1	3	1	1.7
Talc dust containing indolebutyric acid and naphthalene acetamide 1 to 5000 parts talc	0	1	0	0.3
Check.	0	0	2	0.6
Check.	2	4	3	3.0

Three distinct phases or periods of growth may be recognized in the formation of roots: first, the development of unbranched adventitious feeder roots; second, the formation of a mass of highly branched feeder roots; and third, the development of large white fleshy rhizomes that produce upright fiber plants. Under natural conditions the first stage of rooting is generally accomplished in 4 to 6 weeks after planting. Secondary roots are usually formed by the end of the second month. Rhizomes do not usually develop until the third month. These three stages of rooting of *S. trifasciata* are shown in Fig. 2 at 20, 60, and 90 days after planting. Growth of the fiber shoot varies with time of planting and with the individual species but is in the range of 6 to 12 inches for the first 6 months and 20 to 30 inches for the first year. Subsequent growth depends upon the species and the exact conditions of growth.

For propagation, leaves can be divided or sectioned from base to tip, and these sections can be further divided by splitting vertically. Sections 6 to 12 inches in length have given a good reproduction of plant, but 8 to 10 inch sections are most satisfactorily handled for planting. Fig. 3 shows the rooting of two $\frac{1}{8}$ -leaf sections, two $\frac{1}{4}$ -leaf sections, one $\frac{1}{3}$ -leaf section and one $\frac{1}{2}$ -leaf section, of split mid leaf cuttings of *S. guineensis* about 3 months after planting. The $\frac{1}{2}$ -leaf section has four rhizomes as compared to two on the $\frac{1}{3}$ -leaf section and one rhizome on the others. The wide leaf sections are found to produce the best stand of plants. However, the whole leaf sections of *S. trifasciata*, which are relatively narrow, usually produce about the same number of shoots as similar cuttings of *S. guineensis* which are relatively wide.

Fig. 4 shows the development of fiber plants 180 days after planting from the base, middle, and tip sections of the leaf of *S. guineensis*. It is found that few roots and shoots are produced by the basal sections. The rooting is particularly poor. More roots and shoots are produced by the middle sections. Tip sections produce the most rapid and prolific growth. The comparative density of plants produced by base, middle and tip

sections is illustrated in Fig. 5. It is apparent that a rapid and dense population of plants can best be obtained by planting tip sections of the leaf.

It has been found that certain seasonal conditions of

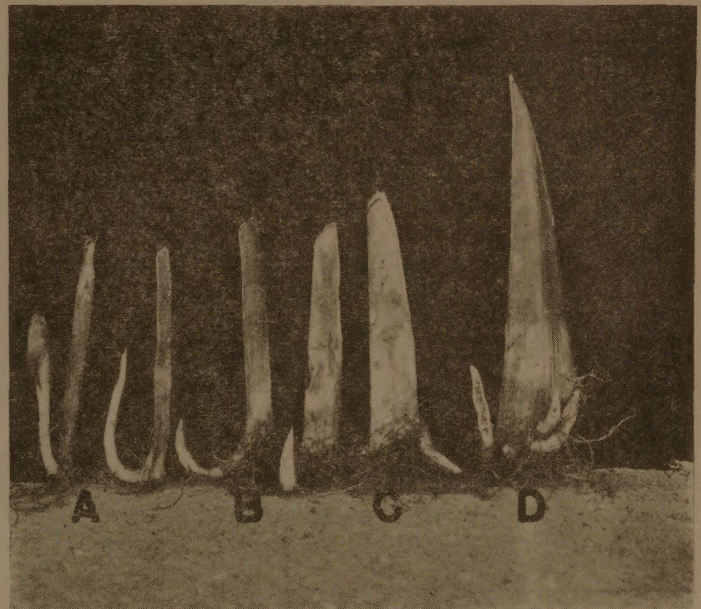


FIG. 3.—The rooting of split midleaf sections of *Sansevieria guineensis*. A, two $\frac{1}{8}$ sections; B, two $\frac{1}{4}$ sections; C, one $\frac{1}{3}$ section; and D, one $\frac{1}{2}$ section about 3 months after planting.



FIG. 4.—The roots and fiber plants of (a) base, (b) middle, and (c) tip sections of a leaf of *Sansevieria guineensis*, 180 days after planting.



FIG. 5.—The comparative density of plants produced by (A) tip, (B) middle, and (C) base sections of *Sansevieria guineensis* planted in August, 1943, on the Oscar Winchester Farm, Boynton, Fla., approximately 1 year after planting.



FIG. 2.—The root development of leaf cuttings of *Sansevieria trifasciata* at 20, 60, and 90 days after planting.

the plant and of the climate affect the survival of leaf cuttings after planting. The per cent survival of base, middle, and tip cuttings of the leaf, 12 inches in length, cut and planted on the 25th day of each month of the fiscal year of 1943-44 at Boynton, Fla., is shown in Fig. 6. Cuttings cut and planted during the early fall season of August-September and the early spring, February-March, show the best survival. Losses due to sun scald and to soft rot are particularly heavy during the months of April, May, June, and July. The basal and tip sections are more seriously affected than the midleaf sections.

The actual establishment of a stand depends not only upon the survival of leaf cuttings but also upon their capacity to reproduce. The net increase of plants 12 months after planting basal, middle, and tip leaf sections planted the 25th day of each month are given in Fig. 7. It is seen from this graph that base sections produce few plants and cannot be considered as suitable planting material. The midsections give a relatively good growth of plants throughout the season. The tip sections give the most prolific growth at cer-

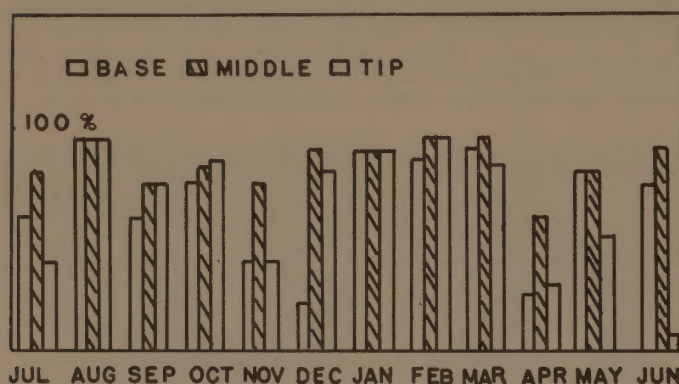


FIG. 6.—The per cent survival of leaf cuttings of *Sansevieria guineensis* 12 inches in length cut and planted the 25th day of each month during the fiscal year of 1943-44 at Boynton, Fla.

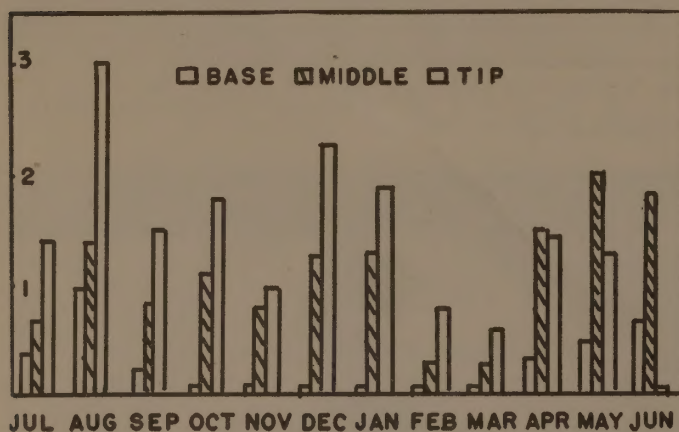


FIG. 7.—The net increase of plants 12 months after planting of leaf cuttings of *Sansevieria guineensis* during the fiscal year of 1944-45 at Boynton, Fla.

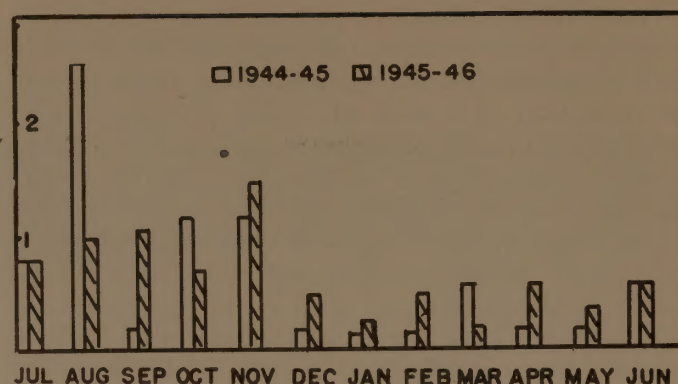


FIG. 8.—The average monthly increment of second year growth of five locations of *Sansevieria guineensis* for fiscal years 1944-45 and 1945-46.

TABLE 2.—The growth of *Sansevieria guineensis* 7 months after planting at Boynton, Fla., Sept. 1, 1944. Planted Feb. 1, 1944

Replicate	Artificial shade		Direct sunlight		Bagasse mulch	
	Inches height	Number plants	Inches height	Number plants	Inches height	Number plants
1	10	128	14	136	22	261
2	15	115	14	127	21	214
Average.....	12½	121	14	131	21½	237

tain times of the year. Those planted in August gave a net increase of three plants per unit planted.

For the production of fiber the growth in length as related to the season of the year may be just as important as the proliferation of plants. Fig. 8 shows the second year growth in inches per month of *Sansevieria guineensis* at Boynton, Fla. for the fiscal year of 1945 and 1946. The fall season July through November gives the most rapid growth in height. This is probably due to more favorable conditions of moisture and available nutrients. The growth of plants under artificial shade, direct sunlight, and in the sun with a heavy mulch are given in Table 2. It is found that summer growth was not improved by artificial shade. The best growth in height and the greatest increase in plants occurred in the mulched plants in direct sunlight. These results suggest that the effects often ascribed to shade are due to the conservation of moisture and nutritional effects of natural mulch of *sansevieria* growing in shaded areas.

Literature Cited

- BROWN, N. E. *Sansevieria*—a monograph of all known species. Royal Bot. Garden, Kew. Bul. Misc. Inf., 5:185-261. 1915.
- BECKLEY, V. A. Some indigenous vegetable fibers. *East African Agr. Jour.*, Oct. 1943.
- DODGE, CHARLES R. Fiber Investigations Report No. 3, U.S.D.A. 1891.
- . Fiber Investigations Report No. 5, U.S.D.A. 1893.

Paper given at 1951 Meetings of
The American Soc. of Agronomy 27 Aug 51
Penn. State College

THE EFFECTS OF NPK FERTILIZATION ON THE GROWTH, THE LEVEL
OF PHOSPHOROUS AND POTASSIUM IN THE SOIL AND TISSUE, AND THE
COLD INJURY OF SANSEVIERIA TRIFASCIATA PRAIN

By E. O. Gangstad, J. F. Joyner, J. B. Pate,
C. C. Seale and W. T. Forsee

OBJECT OF EXPERIMENT: One of the most serious limitations of the production of sansevieria fiber in Florida is the injury of the plant by occasional freezing and near-freezing temperatures during the mid-winter season. Of the species suitable for fiber production, Sansevieria trifasciata Prain has been found to be most cold resistant, but has shown varying degrees of injury under different conditions. The relationship of cold resistance to fertility treatments are observed in the following experiment.

ABSTRACT OF RESULTS: The growth, level of phosphorous and potassium in the soil and plant tissue and the cold injury of Sansevieria trifasciata Prain were studied in a 3 x 3 x 3 NPK factorial experiment at 0, 75 and 150 $\frac{lb}{a}$ of N; 0, 50 and 100 $\frac{lb}{a}$ of P₂O₅ and 100 $\frac{lb}{a}$ of K₂O at Boynton, Florida.

1. It is found that the growth in height is directly related to N and K fertilization. Applications of P did not have a significant effect on height. Data Sheet 1.
2. The level of P in the soil is directly related to the application of phosphate and is not significantly affected by the N and K treatments. Data Sheet 2.
3. The level of K in the soil is directly related to the rate of application of K. It is not significantly affected by N and P. Data Sheet 3.
4. The level of P in the plant tissue is directly related to the rate of application of P but is decreased by N and K. Data Sheet. 4.
5. The level of K in the tissue is directly related to the application of K. It is decreased by N but is not affected by the P treatments. Data Sheet 5.
6. The injury due to cold is directly related to N and K fertilization. It is not greatly affected by the application of P, but there is evidence to indicate that proper and efficient utilization of P depends upon the balance of N and K. Adequate fertilization with N and K very much increased the ability of the plant to withstand cold. Data Sheet. 6.

Paper given at 121 Meeting of
 the American Soc. of
 Penn. State College
 12 June 1880

1. Expt.: NPK factorial
2. Location: O. R. Winchester Farm, near Boynton
3. Soil Type: Leon fine sand
4. Variety: S. trifasciata (Planted Dec. 48)
5. Treatment:

	0	1	2
a) N (Uramon)	0	75	150#/acre
b) P ₂ O ₅ (Super)	0	50	100#/acre
c) K ₂ O (Murate)	0	50	100#/acre
d) Trace elements:	Copper sulfate 25#/acre		
	Manganese sulfate 25#/acre		
	Zinc sulfate 10#/acre		
	Borax 5#/acre		

applied annually during Mar. - April

6. Design: 3 x 3 x 3 factorial, second order interactions confounded
54, plots, 10 x 13 ft.

Data Sheet 1 Sansevieria 49-3
Average Height of 10 plants per plot

Boynton, Fla.
2 Jan. 51

Treat.	Blk. A	Blk. B	Average		OK	1K	2K	Ave.
0-0-0	16.1	15.0	15.6	N 0	17.1	18.1	17.5	17.6
0-0-1	18.5	17.7	18.1					
0-0-2	16.4	18.5	17.4	N 1	18.7	19.3	22.2	20.1
0-1-0	18.2	16.8	17.5					
0-1-1	17.4	17.6	17.5	N 2	18.3	23.1	26.2	22.5
0-1-2	18.6	16.7	17.6					
0-2-0	17.1	19.6	18.4	Ave.	18.1	20.2	21.9	20.0
0-2-1	16.9	20.6	18.8					
0-2-2	14.0	20.5	17.3					
1-0-0	21.9	16.5	19.2					
1-0-1	15.5	24.8	20.1		ON	1N	2N	Ave.
1-0-2	18.9	23.0	21.4					
1-1-0	19.5	19.2	19.3	P 0	17.0	20.3	24.0	20.4
1-1-1	20.5	18.2	19.4					
1-1-2	22.0	24.2	23.1	P 1	17.5	20.6	21.1	19.7
1-2-0	17.9	17.4	17.7					
1-2-1	17.2	19.5	18.4	P 2	18.1	19.3	22.5	20.0
1-2-2	22.4	21.5	22.0					
2-0-0	18.8	20.5	19.7	Ave.	17.6	20.1	22.5	20.1
2-0-1	23.1	23.3	23.2					
2-0-2	28.0	30.4	29.2					
2-1-0	14.9	20.6	17.8					
2-1-1	20.4	21.1	20.8					
2-1-2	22.6	27.1	24.9		OP	1P	2P	Ave.
2-2-0	14.6	20.9	17.8					
2-2-1	25.0	25.6	25.3	K 0	18.1	18.2	17.9	18.1
2-2-2	23.4	25.5	24.5					
				K 1	20.5	19.2	20.8	20.1
				K 2	22.7	21.9	21.2	21.9
				Ave.	20.4	19.8	20.0	20.1
Subblocks		Ave.						
A1		18.8						
A2		18.2						
A3		20.8						
B1		20.4						
B2		20.4						
B3		21.8						

Analysis of Variance

Source	DF	SS	MS	F
Total	53	692.7		
Blocks	5	79.6	15.9	4.1**
N	2	223.0	111.5	28.6**
P	2	4.3	2.1	0.5
K	2	132.9	66.4	17.0**
N x P	4	29.7	7.4	1.9
N x K	4	94.8	23.7	6.1**
P x K	4	11.1	2.8	0.7
Error	30	117.3	3.9	

Data Sheet 2 Sansevieria 49-3
P, lbs. per acre, in Soil Samples taken Jan. 15, 1951

Boynton, Fla.

No.	Treat, N-P-K	Blk. A	Blk. B	Ave.
1.	0-0-0	9	7	8
2.	0-0-1	5	7	6
3.	0-0-2	11	5	8
4.	0-1-0	11	11	11
5.	0-1-1	10	12	11
6.	0-1-2	17	10	13
7.	0-2-0	10	7	9
8.	0-2-1	10	12	11
9.	0-2-2	10	15	12
10.	1-0-0	11	6	9
11.	1-0-1	16	8	12
12.	1-0-2	11	12	11
13.	1-1-0	9	8	9
14.	1-1-1	11	9	10
15.	1-1-2	20	10	15
16.	1-2-0	15	15	15
17.	1-2-1	14	13	14
18.	1-2-2	10	12	11
19.	2-0-0	10	6	8
20.	2-0-1	5	7	6
21.	2-0-2	7	7	7
22.	2-1-0	8	16	12
23.	2-1-1	14	14	14
24.	2-1-2	13	10	12
25.	2-2-0	11	13	12
26.	2-2-1	9	18	13
27.	2-2-2	17	18	17
Aver				
age		11	11	11

	OK	1K	2K	Average
ON	9	9	11	10
1N	11	12	12	12
2N	11	11	12	11
Av.	10	11	12	11

	ON	1N	2N	Ave. **
OP	7	11	7	8
1P	12	11	12	12
2P	11	13	14	13
Av.	10	12	11	11

	OP	1P	2P	Average
OK	8	11	12	10
1K	8	12	13	11
2K	9	13	14	12
Av**	8	12	13	11

Subblocks	Average*
A1	14
A2	10
A3	10
B1	9
B2	11
B3	12

* Difference significant at 5 percent point. L.S.D. (19:1) equals 3

** Difference highly significant. L.S.D. (19:1) equals 2; L.S.D. (99:1) equals 3

No.	Date	Time	Lat.	Long.	Alt.	Wind	Sea	Weather	Remarks
1.	10-0-0	8	11	11	8	11	11	11	11
2.	0-0-1	7	11	11	7	11	11	11	11
3.	0-0-2	11	11	11	11	11	11	11	11
4.	0-1-0	11	11	11	11	11	11	11	11
5.	0-1-1	10	11	11	10	11	11	11	11
6.	0-1-2	11	11	11	11	11	11	11	11
7.	0-2-0	10	11	11	10	11	11	11	11
8.	0-2-1	10	11	11	10	11	11	11	11
9.	0-2-2	10	11	11	10	11	11	11	11
10.	1-0-0	11	11	11	11	11	11	11	11
11.	1-0-1	10	11	11	10	11	11	11	11
12.	1-0-2	11	11	11	11	11	11	11	11
13.	1-1-0	9	11	11	9	11	11	11	11
14.	1-1-1	11	11	11	11	11	11	11	11
15.	1-1-2	10	11	11	10	11	11	11	11
16.	1-2-0	10	11	11	10	11	11	11	11
17.	1-2-1	10	11	11	10	11	11	11	11
18.	1-2-2	10	11	11	10	11	11	11	11
19.	2-0-0	10	11	11	10	11	11	11	11
20.	2-0-1	9	11	11	9	11	11	11	11
21.	2-0-2	9	11	11	9	11	11	11	11
22.	2-1-0	10	11	11	10	11	11	11	11
23.	2-1-1	10	11	11	10	11	11	11	11
24.	2-1-2	10	11	11	10	11	11	11	11
25.	2-2-0	11	11	11	11	11	11	11	11
26.	2-2-1	10	11	11	10	11	11	11	11
27.	2-2-2	10	11	11	10	11	11	11	11

Distances at intervals of 5 seconds given. L.S.D. (10:1) equals 2
 Distances highly significant. L.S.D. (10:1) equals 2; L.S.D. (5:1)

Boynton, Fla.

** Diff. highly signif. L.S.D. (19:1) equals 3; L.S.D. (99:1) equals 4

3. 1st. per case, in each chapter, 1/10/21

Expenditure

No.	Date	Particulars	Debit	Credit	Balance	Total
1.	1-1-21	...	...	...	...	...
2.	1-1-21	...	...	...	...	...
3.	1-1-21	...	...	...	...	...
4.	1-1-21	...	...	...	...	...
5.	1-1-21	...	...	...	...	...
6.	1-1-21	...	...	...	...	...
7.	1-1-21	...	...	...	...	...
8.	1-1-21	...	...	...	...	...
9.	1-1-21	...	...	...	...	...
10.	1-1-21	...	...	...	...	...
11.	1-1-21	...	...	...	...	...
12.	1-1-21	...	...	...	...	...
13.	1-1-21	...	...	...	...	...
14.	1-1-21	...	...	...	...	...
15.	1-1-21	...	...	...	...	...
16.	1-1-21	...	...	...	...	...
17.	1-1-21	...	...	...	...	...
18.	1-1-21	...	...	...	...	...
19.	1-1-21	...	...	...	...	...
20.	1-1-21	...	...	...	...	...
21.	1-1-21	...	...	...	...	...
22.	1-1-21	...	...	...	...	...
23.	1-1-21	...	...	...	...	...
24.	1-1-21	...	...	...	...	...
25.	1-1-21	...	...	...	...	...
26.	1-1-21	...	...	...	...	...
27.	1-1-21	...	...	...	...	...
28.	1-1-21	...	...	...	...	...
29.	1-1-21	...	...	...	...	...
30.	1-1-21	...	...	...	...	...
31.	1-1-21	...	...	...	...	...
32.	1-1-21	...	...	...	...	...
33.	1-1-21	...	...	...	...	...
34.	1-1-21	...	...	...	...	...
35.	1-1-21	...	...	...	...	...
36.	1-1-21	...	...	...	...	...
37.	1-1-21	...	...	...	...	...
38.	1-1-21	...	...	...	...	...
39.	1-1-21	...	...	...	...	...
40.	1-1-21	...	...	...	...	...
41.	1-1-21	...	...	...	...	...
42.	1-1-21	...	...	...	...	...
43.	1-1-21	...	...	...	...	...
44.	1-1-21	...	...	...	...	...
45.	1-1-21	...	...	...	...	...
46.	1-1-21	...	...	...	...	...
47.	1-1-21	...	...	...	...	...
48.	1-1-21	...	...	...	...	...
49.	1-1-21	...	...	...	...	...
50.	1-1-21	...	...	...	...	...
51.	1-1-21	...	...	...	...	...
52.	1-1-21	...	...	...	...	...
53.	1-1-21	...	...	...	...	...
54.	1-1-21	...	...	...	...	...
55.	1-1-21	...	...	...	...	...
56.	1-1-21	...	...	...	...	...
57.	1-1-21	...	...	...	...	...
58.	1-1-21	...	...	...	...	...
59.	1-1-21	...	...	...	...	...
60.	1-1-21	...	...	...	...	...
61.	1-1-21	...	...	...	...	...
62.	1-1-21	...	...	...	...	...
63.	1-1-21	...	...	...	...	...
64.	1-1-21	...	...	...	...	...
65.	1-1-21	...	...	...	...	...
66.	1-1-21	...	...	...	...	...
67.	1-1-21	...	...	...	...	...
68.	1-1-21	...	...	...	...	...
69.	1-1-21	...	...	...	...	...
70.	1-1-21	...	...	...	...	...
71.	1-1-21	...	...	...	...	...
72.	1-1-21	...	...	...	...	...
73.	1-1-21	...	...	...	...	...
74.	1-1-21	...	...	...	...	...
75.	1-1-21	...	...	...	...	...
76.	1-1-21	...	...	...	...	...
77.	1-1-21	...	...	...	...	...
78.	1-1-21	...	...	...	...	...
79.	1-1-21	...	...	...	...	...
80.	1-1-21	...	...	...	...	...
81.	1-1-21	...	...	...	...	...
82.	1-1-21	...	...	...	...	...
83.	1-1-21	...	...	...	...	...
84.	1-1-21	...	...	...	...	...
85.	1-1-21	...	...	...	...	...
86.	1-1-21	...	...	...	...	...
87.	1-1-21	...	...	...	...	...
88.	1-1-21	...	...	...	...	...
89.	1-1-21	...	...	...	...	...
90.	1-1-21	...	...	...	...	...
91.	1-1-21	...	...	...	...	...
92.	1-1-21	...	...	...	...	...
93.	1-1-21	...	...	...	...	...
94.	1-1-21	...	...	...	...	...
95.	1-1-21	...	...	...	...	...
96.	1-1-21	...	...	...	...	...
97.	1-1-21	...	...	...	...	...
98.	1-1-21	...	...	...	...	...
99.	1-1-21	...	...	...	...	...
100.	1-1-21	...	...	...	...	...

* Entry signed at 25 points. L.S.D. (1921) signed
 * Entry signed at 25 points. L.S.D. (1921) signed
 signed

Data Sheet 4 Sansevieria 49-3

Boynton, Jan. 5, 51

Tests for P on fresh tissue samples, % P on oven dry tissue

No.	Treat. N-P-K	Blk. A	Blk. B	Ave.		OP	1P	2P	Average**
1.	0-0-0	0.496	0.693	0.595	ON	0.484	0.500	0.476	0.487
2.	0-0-1	0.291	0.520	0.405	1N	0.353	0.417	0.416	0.395
3.	0-0-2	0.455	0.448	0.452	2N	0.232	0.404	0.464	0.397
4.	0-1-0	0.445	0.558	0.501	Av.*	0.387	0.440	0.452	0.426
5.	0-1-1	0.401	0.570	0.486					
6.	0-1-2	0.557	0.471	0.514					
7.	0-2-0	0.440	0.445	0.442					
8.	0-2-1	0.589	0.367	0.478					
9.	0-2-2	0.365	0.652	0.509	OK	0.460	0.336	0.365	0.387
10.	1-0-0	0.336	0.380	0.358	1P	0.486	0.423	0.412	0.440
11.	1-0-1	0.344	0.347	0.345	2P	0.484	0.425	0.417	0.452
12.	1-0-2	0.350	0.363	0.357	Av.**	0.177	0.394	0.408	0.426
13.	1-1-0	0.427	0.516	0.571					
14.	1-1-1	0.440	0.361	0.401					
15.	1-1-2	0.420	0.339	0.380					
16.	1-2-0	0.462	0.576	0.519					
17.	1-2-1	0.395	0.288	0.342	ON	0.513	0.449	0.468	0.477
18.	1-2-2	0.432	0.342	0.387	1N	0.456	0.363	0.364	0.394
19.	2-0-0	0.396	0.458	0.427	2N	0.491	0.374	0.359	0.408
20.	2-0-1	0.232	0.280	0.256	Av.**	0.487	0.395	0.397	0.426
21.	2-0-2	0.286	0.288	0.287					
22.	2-1-0	0.463	0.508	0.485					
23.	2-1-1	0.397	0.366	0.382					
24.	2-1-2	0.439	0.248	0.343					
25.	2-2-0	0.511	0.472	0.492	Subblocks				Average***
26.	2-2-1	0.371	0.541	0.456	A1				0.444
27.	2-2-2	0.485	0.405	0.445	A2				0.402
	Avor				A3				0.402
	age	0.416	0.437	0.426	B1				0.384
					B2				0.426
					B3				0.502

* Diff. Signif. at 5% point. L.S.D. (19:1) equals 0.052

** Diff. highly signif. L.S.D. (19:1) equals 0.052; L.S.D. (99:1) equals 0.070

*** Diff. signif. at 5% point. L. S. D. (19:1) equals 0.074

Data Sheet 5 Sansevieria 49-3
% K of oven dry tissue 1/5/51

Boynton, Fla.

No.	Treat. N-P-K	Blk. A	Blk. B	Ave.
1.	0-0-0	0.11	0.18	0.15
2.	0-0-1	0.87	1.50	1.18
3.	0-0-2	3.41	1.97	2.69
4.	0-1-0	0.36	0.43	0.39
5.	0-1-1	2.11	1.68	1.89
6.	0-1-2	2.21	2.08	2.15
7.	0-2-0	0.99	0.32	0.66
8.	0-2-1	1.55	1.00	1.28
9.	0-2-2	2.12	1.92	2.02
10.	1-0-0	0.12	0.18	0.15
11.	1-0-1	0.89	1.13	1.01
12.	1-0-2	1.52	1.67	1.59
13.	1-1-0	0.27	0.17	0.22
14.	1-1-1	0.75	0.89	0.82
15.	1-1-2	1.47	1.77	1.62
16.	1-2-0	1.03	0.16	0.59
17.	1-2-1	0.56	0.42	0.49
18.	1-2-2	1.22	1.29	1.26
19.	2-0-0	0.14	0.18	0.16
20.	2-0-1	0.66	0.49	0.58
21.	2-0-2	0.82	0.88	0.85
22.	2-1-0	0.17	0.34	0.25
23.	2-1-1	0.68	0.70	0.69
24.	2-1-2	0.70	1.21	0.96
25.	2-2-0	0.22	0.25	0.23
26.	2-2-1	0.56	0.30	0.43
27.	2-2-2	0.88	0.99	0.94
Aver				
age		0.98	0.89	0.93

	OP	1P	2P	Average
ON	1.34	1.48	1.32	1.38
1N	0.92	0.89	0.78	0.86
2N	0.53	0.63	0.53	0.56
Av.	0.93	1.00	0.88	0.93

	OK	1K	2K	Average
OP	0.15	0.92	1.71	0.93
1P	0.29	1.14	1.57	1.00
2P	0.50	0.73	1.40	0.88
Av.	0.31	0.93	1.56	0.93

	ON	1N	2N	Average
OK	0.40	0.32	0.22	0.31
1K	1.45	0.77	0.57	0.93
2K	2.29	1.49	0.91	1.56
Av.	1.38	0.86	0.56	0.93

Subblocks	Average
A1	1.16
A2	0.92
A3	0.86
B1	0.86
B2	0.89
B3	0.93

Differences between K treat. aver. highly signif. L.S.D. (19-1) = 0.21;
(99-1) = 0.28
Differences between N treat. aver. highly signif. L.S.D. (19-1) = 0.21;
(99-1) = 0.28
K x N interactions highly signif. L.S.D. (19-1) = 0.36; (99-1) = 0.48

Boynston, Fla.

Date Sheet 2, 2/2/51
 1/7 of over 100 times 1/2/51

No.	U-T-C	A	B	Avg.	No.	U-T-C	A	B	Avg.
1.	0-0-0	0.11	0.10	0.10	27.	0-0-0	0.08	0.08	0.08
2.	0-0-1	0.07	1.00	1.10	28.	0-0-0	0.08	0.08	0.08
3.	0-1-0	0.44	1.00	1.00	29.	0-0-1	0.08	0.08	0.08
4.	0-1-0	0.08	0.08	0.08	30.	0-0-1	0.08	0.08	0.08
5.	0-1-1	0.11	1.00	1.00	31.	0-0-0	0.08	0.08	0.08
6.	0-1-0	0.08	0.08	0.08	32.	0-1-0	0.17	0.14	0.15
7.	0-0-0	0.08	0.08	0.08	33.	0-1-1	0.08	0.08	0.08
8.	0-0-1	1.00	1.00	1.00	34.	0-1-0	0.17	0.14	0.15
9.	0-0-0	0.10	1.00	1.00	35.	0-0-0	0.08	0.08	0.08
10.	1-0-0	0.10	0.10	0.10	36.	0-0-0	0.08	0.08	0.08
11.	1-0-1	0.08	0.10	0.10	37.	0-0-0	0.08	0.08	0.08
12.	1-0-0	1.00	1.00	1.00	38.	0-0-0	0.08	0.08	0.08
13.	1-0-0	0.10	0.10	0.10	39.	0-0-0	0.08	0.08	0.08
14.	1-0-0	0.10	0.10	0.10	40.	0-0-0	0.08	0.08	0.08
15.	1-1-1	0.10	0.10	0.10	41.	0-0-0	0.08	0.08	0.08
16.	1-1-0	1.00	1.00	1.00	42.	0-0-0	0.08	0.08	0.08
17.	1-0-1	0.10	0.10	0.10	43.	0-0-0	0.08	0.08	0.08
18.	1-0-0	1.00	1.00	1.00	44.	0-0-0	0.08	0.08	0.08
19.	0-0-0	0.08	0.08	0.08	45.	0-0-0	0.08	0.08	0.08
20.	0-0-1	0.08	0.08	0.08	46.	0-0-0	0.08	0.08	0.08
21.	0-0-0	0.08	0.08	0.08	47.	0-0-0	0.08	0.08	0.08
22.	0-1-0	0.17	0.14	0.15	48.	0-0-0	0.08	0.08	0.08
23.	0-1-1	0.08	0.08	0.08	49.	0-0-0	0.08	0.08	0.08
24.	0-1-0	0.17	0.14	0.15	50.	0-0-0	0.08	0.08	0.08
25.	0-0-0	0.08	0.08	0.08	51.	0-0-0	0.08	0.08	0.08
26.	0-0-0	0.08	0.08	0.08	52.	0-0-0	0.08	0.08	0.08
27.	0-0-0	0.08	0.08	0.08	53.	0-0-0	0.08	0.08	0.08
28.	0-0-0	0.08	0.08	0.08	54.	0-0-0	0.08	0.08	0.08
29.	0-0-0	0.08	0.08	0.08	55.	0-0-0	0.08	0.08	0.08
30.	0-0-0	0.08	0.08	0.08	56.	0-0-0	0.08	0.08	0.08
31.	0-0-0	0.08	0.08	0.08	57.	0-0-0	0.08	0.08	0.08
32.	0-0-0	0.08	0.08	0.08	58.	0-0-0	0.08	0.08	0.08
33.	0-0-0	0.08	0.08	0.08	59.	0-0-0	0.08	0.08	0.08
34.	0-0-0	0.08	0.08	0.08	60.	0-0-0	0.08	0.08	0.08
35.	0-0-0	0.08	0.08	0.08	61.	0-0-0	0.08	0.08	0.08
36.	0-0-0	0.08	0.08	0.08	62.	0-0-0	0.08	0.08	0.08
37.	0-0-0	0.08	0.08	0.08	63.	0-0-0	0.08	0.08	0.08
38.	0-0-0	0.08	0.08	0.08	64.	0-0-0	0.08	0.08	0.08
39.	0-0-0	0.08	0.08	0.08	65.	0-0-0	0.08	0.08	0.08
40.	0-0-0	0.08	0.08	0.08	66.	0-0-0	0.08	0.08	0.08
41.	0-0-0	0.08	0.08	0.08	67.	0-0-0	0.08	0.08	0.08
42.	0-0-0	0.08	0.08	0.08	68.	0-0-0	0.08	0.08	0.08
43.	0-0-0	0.08	0.08	0.08	69.	0-0-0	0.08	0.08	0.08
44.	0-0-0	0.08	0.08	0.08	70.	0-0-0	0.08	0.08	0.08
45.	0-0-0	0.08	0.08	0.08	71.	0-0-0	0.08	0.08	0.08
46.	0-0-0	0.08	0.08	0.08	72.	0-0-0	0.08	0.08	0.08
47.	0-0-0	0.08	0.08	0.08	73.	0-0-0	0.08	0.08	0.08
48.	0-0-0	0.08	0.08	0.08	74.	0-0-0	0.08	0.08	0.08
49.	0-0-0	0.08	0.08	0.08	75.	0-0-0	0.08	0.08	0.08
50.	0-0-0	0.08	0.08	0.08	76.	0-0-0	0.08	0.08	0.08
51.	0-0-0	0.08	0.08	0.08	77.	0-0-0	0.08	0.08	0.08
52.	0-0-0	0.08	0.08	0.08	78.	0-0-0	0.08	0.08	0.08
53.	0-0-0	0.08	0.08	0.08	79.	0-0-0	0.08	0.08	0.08
54.	0-0-0	0.08	0.08	0.08	80.	0-0-0	0.08	0.08	0.08
55.	0-0-0	0.08	0.08	0.08	81.	0-0-0	0.08	0.08	0.08
56.	0-0-0	0.08	0.08	0.08	82.	0-0-0	0.08	0.08	0.08
57.	0-0-0	0.08	0.08	0.08	83.	0-0-0	0.08	0.08	0.08
58.	0-0-0	0.08	0.08	0.08	84.	0-0-0	0.08	0.08	0.08
59.	0-0-0	0.08	0.08	0.08	85.	0-0-0	0.08	0.08	0.08
60.	0-0-0	0.08	0.08	0.08	86.	0-0-0	0.08	0.08	0.08
61.	0-0-0	0.08	0.08	0.08	87.	0-0-0	0.08	0.08	0.08
62.	0-0-0	0.08	0.08	0.08	88.	0-0-0	0.08	0.08	0.08
63.	0-0-0	0.08	0.08	0.08	89.	0-0-0	0.08	0.08	0.08
64.	0-0-0	0.08	0.08	0.08	90.	0-0-0	0.08	0.08	0.08
65.	0-0-0	0.08	0.08	0.08	91.	0-0-0	0.08	0.08	0.08
66.	0-0-0	0.08	0.08	0.08	92.	0-0-0	0.08	0.08	0.08
67.	0-0-0	0.08	0.08	0.08	93.	0-0-0	0.08	0.08	0.08
68.	0-0-0	0.08	0.08	0.08	94.	0-0-0	0.08	0.08	0.08
69.	0-0-0	0.08	0.08	0.08	95.	0-0-0	0.08	0.08	0.08
70.	0-0-0	0.08	0.08	0.08	96.	0-0-0	0.08	0.08	0.08
71.	0-0-0	0.08	0.08	0.08	97.	0-0-0	0.08	0.08	0.08
72.	0-0-0	0.08	0.08	0.08	98.	0-0-0	0.08	0.08	0.08
73.	0-0-0	0.08	0.08	0.08	99.	0-0-0	0.08	0.08	0.08
74.	0-0-0	0.08	0.08	0.08	100.	0-0-0	0.08	0.08	0.08
75.	0-0-0	0.08	0.08	0.08					
76.	0-0-0	0.08	0.08	0.08					
77.	0-0-0	0.08	0.08	0.08					
78.	0-0-0	0.08	0.08	0.08					
79.	0-0-0	0.08	0.08	0.08					
80.	0-0-0	0.08	0.08	0.08					
81.	0-0-0	0.08	0.08	0.08					
82.	0-0-0	0.08	0.08	0.08					
83.	0-0-0	0.08	0.08	0.08					
84.	0-0-0	0.08	0.08	0.08					
85.	0-0-0	0.08	0.08	0.08					
86.	0-0-0	0.08	0.08	0.08					
87.	0-0-0	0.08	0.08	0.08					
88.	0-0-0	0.08	0.08	0.08					
89.	0-0-0	0.08	0.08	0.08					
90.	0-0-0	0.08	0.08	0.08					
91.	0-0-0	0.08	0.08	0.08					
92.	0-0-0	0.08	0.08	0.08					
93.	0-0-0	0.08	0.08	0.08					
94.	0-0-0	0.08	0.08	0.08					
95.	0-0-0	0.08	0.08	0.08					
96.	0-0-0	0.08	0.08	0.08					
97.	0-0-0	0.08	0.08	0.08					
98.	0-0-0	0.08	0.08	0.08					
99.	0-0-0	0.08	0.08	0.08					
100.	0-0-0	0.08	0.08	0.08					

Difference between N cross, aver. highly signif. (10-1) = 0.01;
 (99-1) = 0.01;
 Difference between N cross, aver. highly signif. (10-1) = 0.01;
 (99-1) = 0.01;
 N x W interaction highly signif. (10-1) = 0.01; (99-1) = 0.01

Date Sheet 6 Sansevieria 49-3
Average injury of leaf tip 2 Jan. 51

Boynton, Fla.

Treat.	Blk. A	Blk. B	Ave.		OP	1P	2P	Average
				NO	8.9	11.2	10.8	10.5
0-0-0	11.6	8.7	10.2	N1	8.7	8.7	9.6	9.0
0-0-1	11.6	9.5	10.6	N2	6.5	7.5	6.4	6.3
0-0-2	8.6	3.8	6.2	Av.	8.1	9.1	8.9	8.7
0-1-0	13.4	11.3	12.4					
0-1-1	10.6	11.2	10.9					
0-1-2	10.9	9.8	10.4					
0-2-0	11.5	5.7	8.6					
0-2-1	11.0	13.9	12.5		OK	1K	2K	Average
0-2-2	8.9	13.6	11.3	PO	9.0	9.4	5.8	8.1
1-0-0	12.2	9.3	10.8	P1	9.9	10.3	7.2	9.1
1-0-1	10.3	3.2	6.8	P2	10.4	8.4	8.0	8.9
1-0-2	10.8	6.6	8.7	Av.	9.8	9.3	7.0	8.7
1-1-0	12.7	2.7	7.7					
1-1-1	11.4	10.9	11.5					
1-1-2	10.6	4.0	7.3					
1-2-0	12.4	9.5	11.0		ON	1N	2N	Average
1-2-1	11.2	8.5	9.9	KO	10.4	9.8	9.2	9.8
1-2-2	7.8	8.3	8.1	K1	11.3	9.2	7.4	9.3
2-0-0	8.5	3.8	6.2	K2	9.3	8.0	3.8	7.0
2-0-1	12.0	9.5	10.8	Av.	10.3	9.0	6.8	8.7
2-0-2	4.3	0.9	2.6					
2-1-0	9.8	9.5	9.7					
2-1-1	10.4	7.1	8.8					
2-1-2	7.0	1.1	4.1					
2-2-0	11.0	12.4	11.7		Subblocks			Average
2-2-1	4.5	1.0	2.8	A1				9.8
2-2-2	3.2	6.3	4.8	A2				10.6
				A3				9.3
				B1				8.9
				B2				6.7
				B3				6.8

Analysis of Variance

Source	DF	SS	MS	F
Total	53	640.8		
Blocks	5	117.8	23.6	2.8*
N	2	114.0	57.0	6.8**
K	2	78.3	39.6	4.7*
P	2	11.6	5.8	0.7
NK	4	34.0	8.5	1.0
NP	4	12.7	3.2	0.4
PK	4	20.1	5.0	0.6
Error	30	252.3	8.4	

Chemical Weed Control

in

Sansevieria
with

CMU

10-20-1919

10-20-1919

10-20-1919

10-20-1919

10-20-1919

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CHEMICAL WEED CONTROL IN SANSEVIERIA
WITH CMU (PARA CHLOROPHENYL DIMETHYL UREA),

by

E. O. Gangstad, C. C. Seale, J. F. Joyner & J. B. Peto

Object of Experiment: Because sansevieria has a relatively slow rate of growth, weed competition is a major problem in the culture of the plant for production of fiber. Mechanical cultivation is not effective for control of weeds within the row and cannot be practiced after the plants begin to fill in between the rows.

Abstract of Results: On sandy soils, pre-emergence treatment with CMU at rates of 3-5 lbs. active ingredient per acre in 100 gallons of water gave good control of weeds for a period of 5-6 months. In contrast, post-emergence applications to relatively heavy growths of weeds at rates of 7 to 10 lbs. active ingredient per acre gave good weed control for 3-4 months.

At rates above 10# per acre, the sansevieria was injured but most of the plants recovered in 3 to 4 months.

These higher rates of application are required on organic soils or under conditions of extremely high rainfall.

For best results, the chemical should be applied at the beginning or near the end of the rainy season when the rainfall is moderate but not excessive.

† Experimental woodicide supplied through the courtesy of Dale E. Wolf, Grasselli Chemicals Department, DuPont de Nemours & Co.

Outline

Sansevieria 51-13

Indiantown

7 May 51, revised 23 May 51

1. Expt.: Chemical weed control
2. Location: Indiantown, Troop Farm
3. Soil: Light loam sand
4. Variety: S. trifasciata
5. Treatment: 51-13a 23 May 51
 - a. TCA 30#/a (No trichloracetate, Dow 60%)
 - b. MH 30#/a (Maleic Hydrazide, Naugatuck Chemical 30%)
 - c. CMU 10#/a (Parachlorophenyl-1,1-dimethylurea 80% DuPont Experimental)
 - d. Check

Field trial with covered sprayer on row middle, two, two row replicate

Treatment: 51-13b 9 July 51

- a. Check
- b. 5#/a CMU (80%)
- c. 10#/a CMU (80%)
- d. 15#/a CMU (80%)

Field trial two three row replicate

Treatment: 51-13c 19 July 51

- a. Check
- b. 4#/a (active)
- c. 7#/a
- d. 10#/a
- e. 13#/a

Field trial two three row replicates

Indication

Controlled by 1-12

Control

1. The following items are:

2. The following items are:

3. The following items are:

4. The following items are:

5. The following items are:

6. The following items are:

7. The following items are:

8. The following items are:

9. The following items are:

10. The following items are:

11. The following items are:

12. The following items are:

13. The following items are:

14. The following items are:

15. The following items are:

16. The following items are:

17. The following items are:

18. The following items are:

19. The following items are:

20. The following items are:

21. The following items are:

22. The following items are:

Data Sheet 1 Sansevieria 51-13a

Indiantown

Revised 23 May 51

Observation 3 July 51, six weeks after treatment, treatment 23 May 51
(No. weeds per 3 sq. ft. plot, taken at random from row numbers at
every 100 feet of tow, south to north)

Samples	Check			MH			TCA			CMU		
	a	b	T	a	b	T	a	b	T	a	b	T
1	8	54	62	0	68	68	13	27	40	0	2	2
2	17	87	104	2	90	92	8	20	28	0	1	1
3	15	60	75	5	43	48	5	9	14	0	0	0
4	9	82	91	9	32	41	6	24	30	0	1	1
5	15	74	89	10	38	48	12	9	21	0	0	0
6	33	28	61	8	15	23	31	0	31	0	3	3
Total	97	385	482	34	286	320	75	89	164	0	7	7
Difference						162			318			475
% Control						34			65			98

a) Broad leaf weeds, about 75% purslane

b) Grass weeds, about 50% Bermuda

REMARKS Fair weed control with TCA. Good control with CMU. Little
or no control with MH.

Data Sheet 1

S-nsevieria 51-13b

Indiantown

Green weight in oz. of weeds per plot, 5 x 5 ft. sq. (25 sq. ft.)
 Observations 1 Aug. 51, 12 days after treatment

Treatment	I	II	III	IV	Total	% Weed Control
Control	68	54	59	51	232	
CMU 4#/a (active)	14	15	16	11	56	75
7#/a	9	6	7	5	27	88
10#/a	8	7	4	7	26	89
13#/a	6	4	7	2	19	91
	165	86	93	76	360	

Analysis of Variance

Source	DF	SS	V	F
Total	19	8414		
Replicate	3	1752	577	4.9
Treatment	4	5265	1316	11.2
Error	12	1417	118	

REMARKS: A moderate infestation of weeds were present uniformly over area before treatment. The weeds of the treatments were severely injured. From visual observations, the 4#/a rate, although giving considerable control, was not adequate to kill the Bermuda grass. At this date, differences between the 7, 10 and 13 pound rate were very slight, but probably somewhat greater than indicated by the percent control.

Summary Sheet 1 Sansevieria 51-13
 Observations 29 Oct. 51, Approx. 6 months after treatment.

Indiantown

Sansevieria 51-13a; treatment applied 23 May 51

#/acro (Active)	I	II	Av.	% Control
(1) MH (10#a)	5.0	5.0	5.0	Nil
(2) TCA (19#a)	5.0	5.0	5.0	Nil
(3) CMU (8#a)	3.5	4.0	3.7	35

Remarks: CMU treatment effective for about 5 months in these plots.
 TCA, for about 2 months

Observations 6 Nov. 51, approx. 5 months after treatment.
 Sansevieria 51-13b: treat. 9 July 51, post-emergence.

#/a Active CMU	I	II	Av.	% Control
(1) Check	5.0	5.0	5.0	0
(2) 4#/a	3.5	2.5	3.0	50
(3) 8#/a	2.0	3.0	2.5	60
(4) 12#/a	1.5	1.0	1.3	85

Remarks: 12# rate effective, slight injury to sansevieria.

Observations 6 Nov. 51, approx. 4 months after treatment.
 Sansevieria 51-13c: treat. 19 July 51, pre-emergence

#/a Active AMU	I	II	Av.	% Control
Check	5.0	5.0	5.0	0
4#/a	1.5	2.0	1.7	75
7#/a	1.0	1.0	1.0	90
10#/a	0.0	0.0	0.0	100
13#/a	0.0	0.0	0.0	100

Remarks: No injury to sansevieria at any rate. CMU applied about one month after transplanting sansevieria; plants not actually growing at time of application.
 Tomato plants survived in treat. 4, 13b, after third month.

Summary Sheet 2 Sansevieria 51-13
Observations 6 Nov. 51

Indiantown

- (1) No injury noted in 51-13a
- (2) Approx. 15% of plants in 12 $\frac{1}{2}$ "/a treatment of 51-13b showed some sign of injury. About 1% died and the rest showed good signs of recovery.
- (3) No apparent injury to plants in 51-13C, but trends indicate 13 $\frac{1}{2}$ "/a reduced rate of growth.

# Activo CMU		Plants per 100 Row Feet			Rhizomes per 100 Row Feet		
		I	II	Total	I	II	Total
0 $\frac{1}{2}$ "/a	(1)	108	78	186	36	36	72
	(2)	102	63	165	30	28	58
				<u>351</u>			<u>130</u>
4 $\frac{1}{2}$ "/a	(1)	78	90	168	45	42	87
	(2)	72	102	174	45	48	93
				<u>332</u>			<u>180</u>
7 $\frac{1}{2}$ "/a	(1)	84	114	198	39	42	81
	(2)	93	92	185	75	54	129
				<u>383</u>			<u>210</u>
10 $\frac{1}{2}$ "/a	(1)	105	117	222	57	51	108
	(2)	90	114	204	30	63	93
				<u>426</u>			<u>201</u>
13 $\frac{1}{2}$ "/a	(1)	94	93	187	39	30	69
	(2)	72	108	180	27	42	69
				<u>267</u>			<u>138</u>

Remarks: 13 $\frac{1}{2}$ "/a appears to have reduced rate of growth equal to weed competition of the check plots.

Outline Sansevieria 51-17

Jupiter

1. Expt.: Chemical weed control (CMU)
2. Location: Westerveld Farm, 12 miles NW Jupiter
3. Soil: Light loam sand
4. Variety: S. trifasciata
5. Treatment: CMU, DuPont Expt'l. weedicide
 0. Check
 - a. 2#/a CMU active ingredient in 100 gal. water
 - b. 4#/a
 - c. 7#/a
 - d. 10#/a
 - e. 14#/a
 - f. 18#/a
6. Design: Random block, 4 replicates. Plot 7.5 x 200 ft., split for plants and cuttings

1. Project: General and control (GNC)
2. Location: Westwood Town, 18 miles NW London
3. Date: 14th Jan 1964
4. Version: 1.1 (1st)
5. Revision: 1.1 (1st)
6. Check: 1.1 (1st)
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97. 1.1 (1st)
98. 1.1 (1st)
99. 1.1 (1st)
100. 1.1 (1st)

Treatment 6 Aug. 51, Oz. weeds per 12 sq. ft. area of plot 25 days after treatment

Treatment	I	II	III	IV	Total	% Weed Control
Check	23	35	18	28	104	
2# (Active)	18	21	13	19	71	32
4#	20	18	7	17	62	40
7#	6	13	17	9	45	56
10#	7	14	15	10	46	55
14#	6	5	2	3	16	85
18#	3	6	3	5	17	83
	83	112	75	91	561	

Source	DF	SS	V	F
Total	27	1863		
Replicate	3	109	56	2.1
Treatment	6	1442	240	14.1
Error	18	312	17	

REMARKS: Weed control at the 14 and 18# rates considered satisfactory. Low rates did not give good weed kill under conditions of experiment.

Treatment was applied under rather unfavorable conditions. There was a heavy growth of weeds, about 5900# green weight per acre. Water was standing in local areas before and during application, and rain fell within one hour after treatment was completed. Rains continued intermittently three to four times per week thereafter.

No injury to the sansevieria was noted at the time of observation.

Some regrowth of crab grass was noted in the 10 and 14# rate at this date.

Date Sheet 2 Sansevieria 51-17

Jupiter

Planted Feb. 1951. CMU treatment 12 July 51
Observations 8 Nov. 51, plants per 12 feet of row

#CMU (Active)	II	III	IV	Total	% Check
0#/a	33	32	38	103	
2#/a	32	35	35	102	99
4#/a	34	33	35	102	99
7#/a	34	32	36	102	99
10#/a	34	41	29	104	101
14#/a	28	37	35	110	107
18#/a	31	43	32	106	103

Remarks: No apparent injury to sansevieria. Weed control in 14 and 18# rates good five months after treatment. In this experiment 10# rate or lower was not effective for weed control. The low level of injury may be due to alkaline conditions of the soil or dilution by high rainfall.

Outline Sansevieria 51-15
 51-15a
 51-15b

Boynton

1. Expt.: Chemical weed control in sansevieria
2. Location: O. R. Winchester Farm
3. Soil: Leon fine sand
4. Variety: Leaf cuttings of S. trifasciata planted in January 1951
5. Treatment: 23 July 51; CMU 80%; 100 gal. water/a
 - a. Check
 - b. 5#/a total, 4# active
 - c. 10#/a total, 8# active
 - d. 15#/a total, 12# active
6. Design: Random blocks, 4 replicates, 4 x 40 ft. plot

N	I	1/a	II	5/c	III	9/d	IV	13/d
		2/b		6/a		10/b		14/c
		3/c		7/b		11/a		15/b
		4/d		8/d		12/c		16/a

7. Field trial 51-15a leaf cuttings
Treatment CMU (80%); 7 Aug. 51; 1/10 acre plots
Treatment applied to clean cultivated area
N (1) Unweeded check (2) 4#/a active
S (3) Weeded check (4) 2#/a (5) 6#/a
8. Field trial 51-15b whole plants
Treatment CMU (80%); 23 Aug. 51; 1/10 acre plots
Treatment applied to moderate growth of weeds
E (1) Unweeded check (2) 12#/a (active)
W (3) Weeded check (4) 8#/a (active)

Treatment 23 July 51 CMU (80% Active Ingredient) DuPont Expt'l.
 Observations 7 Aug. 51, 24 days after treatment

Oz. green wt. of weeds per 40 sq. ft. of plot

Treatment	I	II	III	IV	Total	% Control
Check	50	61	52	63	226	
4# (Active)	14	20	13	16	63	72
8#	2	1	1	6	9	96
12#	0	0	1	3	4	98
	65	82	67	88	302	

Source	DF	SS	V	F
Total	15	8,263		
Replicate	3	95	32	3.5
Treatment	3	8,085	2,695	299.1
Error	9	83	9	

REMARKS: Applied under fairly good conditions. Rain fell about six hours after treatment. Weed growth was moderate, about 3800#/A in control at time of observations. Area was inundated several times shortly after treatment. Rains intermittent about twice a week.

Weed control considered satisfactory in the 8 and 12#/A treatments.

In a clean cultivated plot adjacent to experiment, good control was obtained with the 4# rate. Slight regrowth of crab grass noted at time of observation.

In a very weedy plot adjacent to the area, a 12# rate gave only fair control of weeds. No injury to *sansovioria* noted at this date in any of the treatments.

OBSERVATIONS: 51-15 4 Oct. 51

All rates clean with no observable difference between rates. No injury to sansevieria noted. Check growth of weeds about 10 inches high, competing somewhat with sansevieria.

OBSERVATIONS: 51-15a 4 Oct. 51

1. Dense growth on unweeded part
2. 5#/a (4% active) has only few scattered weeds. New growth coming in.
3. Weeded check required second weeding
4. 2 $\frac{1}{2}$ /a (2#/active) has considerable growth of weeds. Second application made
5. 7.5#/a (6#/active) very few weeds. No regrowth of weeds noted. No serious injury to sansevieria

OBSERVATIONS: 51-15b 4 Oct. 51

1. Unweeded check, weed growth about 18 inches high, serious competition to sansevieria
2. 15#/(12# active) considerable injury to sansevieria
3. Weeded check, second weeding necessary
4. 10# (8# active) considerable injury to sansevieria

Data Shoot 3, *Sansevieria* 51-15

Boynton

Observations: 8 Nov. 51, $4\frac{1}{2}$ Months After Treatment, 95-100% Control of Woods51-15, Leaf Cuttings, Plants per 20 Feet of Row

CMU	I	II	III	IV	Total
0#/a	105	110	117	116	448
4#/a	139	157	121	157	574
8#/a	132	147	137	133	549
12#/a	154	148	126	136	564

Remarks: #/a CMU (Active) applied about 5 months after planting of leaf cuttings, but before plants emerged. Wood competition significantly reduced stand of check. No apparent injury to young plants.

51-15a, Leaf Cuttings, plants per 6.7 ft.

CMU	I	II	III	IV	V	Total
0#/a	38	44	39	35	28	184
2 $\frac{1}{2}$ #/a*	50	46	52	42	33	223
4#/a	37	46	41	38	39	201
6#/a	41	46	50	48	49	239

Remarks: #/a CMU (Active) applied to clean cultivated plots, check hand wooded. No significant difference of treatments. No apparent injury to *sansevieria*.

*Second application necessary 4 Oct. 51, 2 months after first.

51-15b, Whole plants, plants per meter

	Not Wooded		Hand Wooded		CMU 8#/a		CMU 12#/a	
	Tot.	Inj.	Tot.	Inj.	Tot.	Inj.	Tot.	Inj.
I	41	0	59	0	43	8	52	9
II	60	0	66	0	61	11	63	6
III	52	0	48	0	63	10	60	15
S	153	0	173	0	167	29	175	30
% In.		0		0		17.4		17.1

Remarks: Plants mostly recovered, injury slight.

UNITED STATES DEPARTMENT OF AGRICULTURE
 BUREAU OF PLANT INDUSTRY
 WASHINGTON, D. C.

Report on the results of the investigation of the diseases of the cotton plant in the State of Texas, 1911.

Year	1911	1910	1909	1908	1907
Area	100	100	100	100	100
Yield	100	100	100	100	100
Loss	100	100	100	100	100

The following table shows the results of the investigation of the diseases of the cotton plant in the State of Texas, 1911. The table is divided into two parts, one for the area and one for the yield. The area is given in acres and the yield in bushels per acre. The loss is given in percent.

Table 1. Results of the investigation of the diseases of the cotton plant in the State of Texas, 1911.

Year	1911	1910	1909	1908	1907
Area	100	100	100	100	100
Yield	100	100	100	100	100
Loss	100	100	100	100	100

The following table shows the results of the investigation of the diseases of the cotton plant in the State of Texas, 1911. The table is divided into two parts, one for the area and one for the yield. The area is given in acres and the yield in bushels per acre. The loss is given in percent.

Table 2. Results of the investigation of the diseases of the cotton plant in the State of Texas, 1911.

Year	1911	1910	1909	1908	1907
Area	100	100	100	100	100
Yield	100	100	100	100	100
Loss	100	100	100	100	100

The following table shows the results of the investigation of the diseases of the cotton plant in the State of Texas, 1911. The table is divided into two parts, one for the area and one for the yield. The area is given in acres and the yield in bushels per acre. The loss is given in percent.

Outline Sansevieria 51-16a
 16b
 16c

Fort Lauderdale

1. Expt.: Chemical weed control
2. Location: Naval Air Station, Fort Lauderdale
3. Soil: Davie fine sand
4. Variety: S. longiflora, S. guineensis, S. trifasciata and
S. Laurentii
5. Treatment: 51-16a, 17 July 51
 0, 1, 7, 10, 14#/a active CMU (100 gal./a water)

 51-16b, 16 Aug. 51
 4#/a 2,4-D overall applications

 51-16c 11 Sept. 51
 A. CMU 3#/a active ingredient
 TCA 10#/a active ingredient

 B. TCA 10#/a active ingredient
 2,4-D 3#/a active ingredient

 C. CMU 3#/a active ingredient
 2,4-D 3#/a active ingredient
6. Design: 4 replications, plot size 9 x 18 and 9 x 6 ft.,
 random block

1. The first...

2. The second...

3. The third...

4. The fourth...

5. The fifth...

6. The sixth...

7. The seventh...

8. The eighth...

9. The ninth...

10. The tenth...

11. The eleventh...

12. The twelfth...

13. The thirteenth...

14. The fourteenth...

15. The fifteenth...

16. The sixteenth...

17. The seventeenth...

18. The eighteenth...

19. The nineteenth...

20. The twentieth...

21. The twenty-first...

Data Sheet 1

Sansevieria 51-16a

Fort Lauderdale

Treatment CMU, 80% active ingredient, DuPont Expt'l Weedicide applied as spray in 100 gal. water per acre. 17 July 51
 Observations, 7 Aug. 51, 23 days after treatment

Treatment	I		II		III		IV		Av.		Control	
	a	b	a	b	a	b	a	b	a	b	a	b
Check	5	5	5	5	5	5	5	5	5	5	0	0
1#/a (active)	5	5	5	4	5	5	5	5	5	5.8	0	14
7#/a	3	4	3	2	4	3	3	1	3.3	2.0	43	70
10#/a	4	2	2	1	3	2	3	2	3.0	1.8	50	74
14#/a	3	1	2	1	3	2	2	1	2.0	1.3	70	64

REMARKS: Applied under fair conditions. Rain shortly after application, but limited thereafter, about once a week. Moderate growth of weeds but mostly nut grass which appears to require a rather high rate of application for control. It appears that a higher rate of application is required on this type of soil, mixture of muck and sand, than on sand.

An area of para grass sprayed at 15#/ (active ingredient) showed a good kill. A rate of 10# was much less effective. An area clean cultivated but seriously infested with nut grass, did not give control at the 7# rate.

Some slight injury to the sansevieria was observed at the 14# rate.

1	equals	90%	control	of	weeds
2	"	70%	"	"	"
3	"	50%	"	"	"
4	"	30%	"	"	"
5	"	10%	"	"	"

Data Sheet 2

Sansevieria 51-16b

Fort Lauderdale

2,4-D applied overall 16 Aug. 51; observations 11 Sept. 51

	CMU	14#/a	10	7	1	0
IV.		2.0	2.0	2.5	2.5	4.0
III		1.5	2.0	2.0	2.5	2.5
II		2.5	2.0	2.5	5.0	4.0
I		1.5	2.5	2.0	2.5	3.0
		7.5	8.5	9.0	12.5	13.5
Av.		1.9	2.1	2.3	3.1	3.4
% Control		72	68	64	48	42

Ratings: 1 equals 90% control of weeds
 2 " 70% " " "
 3 " 50% " " "
 4 " 30% " " "
 5 " 10% " " "

REMARKS: No serious injury observed on sansevieria. Weeds not killed are broom sedge, nut grass and spurge. Good control of other weeds.

Data Sheet 3

S-nsevieria 51-16c

Fort Lauderdale

Applied 11 Sept. 51; observations 21 Sept. 51

	CMU	14#/a	10	7	1	0
A	1	0.5	2.0	2.0	1.5	1.0
TCA 10						
#/a	5	1.5	1.5	2.5	3.0	3.0
CMU 3						
#/a	9	0.5	1.0	1.5	2.0	1.5
	10	1.0	0.5	1.5	1.5	3.0
Total		3.5	5.0	7.5	8.0	8.5
B	2	1.0	0.5	1.5	2.0	2.0
TCA 10						
#/a	4	1.5	1.0	2.5	1.5	2.5
2,4-D						
3#/a	7	0.5	1.0	1.5	2.0	1.0
	12	1.0	0.5	1.0	1.0	1.0
Total		4.0	3.0	6.5	6.5	6.5
C	3	0.5	1.0	1.0	2.0	1.5
CMU 10						
#/a	6	1.0	1.5	2.0	3.0	2.5
2,4-D						
3#/a	8	0.5	1.5	2.5	2.5	3.0
	11	1.5	1.0	2.0	2.0	2.5
Total		3.5	5.0	7.5	9.5	9.5

CMU rates applied 17 July 51; 2,4-D applied 16 Aug. 51; treatments A, B, C, applied.

TCA treatments gave slight injury to *S. guineensis* and *S. longiflora* at this rate. Weed growth not controlled by CMU or 2,4-D were fairly well controlled by TCA.

Data Sheet 4

Sansevieria 51-16c

Fort Lauderdale

Treatment applied 11 Sept. 51; observation 11 Oct. 51

	CMU	14#/a	10#/a	7#/a	1#/a	0
A	1	1.0	2.0	1.0	2.0	3.0
TCA						
10#/a	5	1.0	1.5	2.5	3.0	2.0
CMU						
3#/a	9	1.0	1.0	1.0	2.0	2.5
	10	1.0	2.0	1.0	1.5	1.5
Total		4.0	6.5	5.5	8.5	9.0
B	2	1.0	1.5	1.5	1.5	2.5
TCA						
10#/a	4	1.0	1.5	2.0	2.5	2.0
2,4-D						
3#/a	7	1.0	1.0	1.0	3.0	1.5
	12	1.5	1.5	1.5	1.0	4.0
Total		4.5	5.5	6.0	8.0	10.0
C	3	1.5	1.5	1.5	1.0	1.5
CMU						
3#/a	6	1.0	1.0	1.5	2.0	3.5
2,4-D						
3#/a	8	1.0	2.0	3.0	3.0	4.0
	11	1.0	2.0	1.5	2.0	4.0
Total		4.5	6.5	7.5	8.0	13.0

Table 1. Summary of the results of the analysis of variance for the effect of the treatment on the yield of the crop. The results are given in the following table.

Treatment	Yield (kg/ha)	Standard Error	Mean Square	D.F.	F-value	Significance
Control	1.0	0.2	1.0	1	1.0	0.33
T1	1.5	0.2	2.25	1	2.25	0.17
T2	2.0	0.2	4.0	1	4.0	0.06
T3	2.5	0.2	6.25	1	6.25	0.02
T4	3.0	0.2	9.0	1	9.0	0.00
Total	10.0	0.2	10.0	4	10.0	0.00
Control	1.0	0.2	1.0	1	1.0	0.33
T1	1.5	0.2	2.25	1	2.25	0.17
T2	2.0	0.2	4.0	1	4.0	0.06
T3	2.5	0.2	6.25	1	6.25	0.02
T4	3.0	0.2	9.0	1	9.0	0.00
Total	10.0	0.2	10.0	4	10.0	0.00
Control	1.0	0.2	1.0	1	1.0	0.33
T1	1.5	0.2	2.25	1	2.25	0.17
T2	2.0	0.2	4.0	1	4.0	0.06
T3	2.5	0.2	6.25	1	6.25	0.02
T4	3.0	0.2	9.0	1	9.0	0.00
Total	10.0	0.2	10.0	4	10.0	0.00

Outline

Sansevieria 51-19

Belle Glade

1. Expt.: Weed control
2. Location: Everglades Experiment Station (Sec. 10)
3. Soil: Everglades peat
4. Variety: S. trifasciata
5. Treatment: 13 Sept. 51, applied in 100 gal. water acre
 - a. 2,4-D NaSalt (80%) $2\frac{1}{2}\#/\text{a}$ acid equivalent
 - b. 2,4-D NaSalt (80%) $5\#/\text{a}$ acid equivalent
 - c. CMU (80% active) $5\#/\text{a}$ active ingredient
 - d. CMU (80% active) $10\#/\text{a}$ active ingredient
 - e. Treatment a plus c
 - f. Treatment b plus d
6. Design: Random block, 18 x 18 ft. plot, three replicates
7. Field Plan

	I	II	III
1	a	f	c
2	b	a	c
3	c	d	f
4	d	c	b
5	c	b	d
6	f	c	a

Data Sheet 1

Sansevieria 51-19

Belle Glade

Treatment applied 13 Sept. 51, observations 15 Oct. 51

Treatment	I		II		III		Average Rating	
	x	y	x	y	x	y	y	y
<u>2,4-D</u>								
2 $\frac{1}{2}$ #/a	1	2	2	3	3	2	2.0	2.3
5#/a	1	4	1	3	1	3	1.0	3.3
<u>CMU</u>								
5#/a	3	1	2	1	3	1	2.6	1.0
10#/a	3	1	3	1	3	1	3.0	1.0
<u>2,4-D plus CMU</u>								
2 $\frac{1}{2}$ -5	2	1	1	2	1	2	1.3	1.6
5-10	1	3	2	3	1	2	1.3	2.3

REMARKS: Considerable injury to sansevieria noted with 2,4-D at 5# rate. CMU not very effective on broad leaf weeds at low rate but good kill of weeds by combination.

Treatment Applied, 13 Sept. 51, Observation 16 Nov. 51

Treatment	I		II		III		Average Rating	
	x	y	x	y	x	y	x	y
2,4-D								
$2\frac{1}{2}\#/a$	1.0	2.0	1.0	1.0	2.0	2.0	1.0	1.6
5#/a	1.0	3.0	1.0	4.0	1.0	3.0	1.0	3.1
CMU								
5#/a	3.0	1.0	2.0	1.0	3.0	1.0	2.7	1.0
10#/a	2.0	1.0	3.0	1.0	2.0	1.0	2.3	1.0
2,4-D & CMU								
$2\frac{1}{2} - 5$	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5 - 10	1.0	3.5	1.0	2.0	1.0	2.0	1.0	2.5

x weed control

1. Very good
2. Good
3. Fair
4. Poor
5. Very poor

y injury to sansevieria

1. None
2. Light
3. Moderate
4. Severe
5. Very severe

Test results for 10-10-1961

Temperature									
Time									
Location									
Wind									
Humidity									
Pressure									
Clouds									
Precipitation									
Sun									
Moon									
Phase									
Illumination									
Altitude									
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Summary Sheet Sansevieria 51-13, 15, 16, 17, 19

CMU Weed control, May-Nov. 51, S. trifasciata

Location and Soil Type	CMU #/a (Active)	Control Percent	Duration Months	Sansevieria Injury
Post-emergence				
Indiantown	4	50	3-4	Nil
Light sand	8	60	4-5	Nil
(acid)	12	85	5 plus	Slight
Pro-emergence				
	4	75	3-4	Nil
	7	90	4-5	Nil
	10	100	4-5 plus	Nil
	13	100	4-5 plus	Slight
Post-emergence				
Jupiter	10	55	1-2	Nil
Light sand	14	88	3-4	Nil
(Neutral)	18	83	3-4	Nil
Post-emergence				
Boynton	4	72	5 plus	Nil
Light sand	8	96	5 plus	Nil
(acid)	12	98	5 plus	Slight
Pro-emergence				
	2 $\frac{1}{2}$	90	2-3	Nil
	4	90 plus	5 plus	Nil
	6	90 plus	5 plus	Nil
Ft. Lauderdale	10	Fair	3-4	Nil
Mucky sand	14	Fair	4 plus	Slight
Belle Glade	5	Fair	2-3	Nil
Peat	10	Fair	3 plus	Nil

